MAY 8, 1954 PAGES 939 TO 990

THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, PATHOLOGY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6819 LONDON: SATURDAY, MAY 8, 1954 CCLXVI

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ORIGINAL ARTICLES

Artificial Respiration by Intermittent Positive Pressure
A. CRAMPTON SMITH, M.B.
J. M. K. SPALDING, M.R.C.P.
W. RITCHIE RUSSELL, F.R.C.P. 939

Side-effects of Oxytetracycline Therapy
PETER HAY, M.B.
PETER MCKENZIE, M.B..... 945

Hyperthyroidism and Myasthenia Gravis
BRUCE MACLEAN, F.R.C.P.
J. A. C. WILSON, M.R.C.P.... 950

Surgical Treatment of Acute Osteitis in Childhood
A. E. BREMNER, F.R.C.S.E.
G. A. NELIGAN M.R.C.P.
C. K. WARRICK, F.R.C.S.E... 953

Resistant Ventricular Tachycardia
R. E. LOVELACE, M.B.
G. D. WALKER, M.R.C.P..... 957

A Potent Group-O Cell-agglutinin of Human Origin with H-specific Character
WINIFRED M. WATKINS, PH.D.
Prof. W. T. J. MORGAN, D.SC., F.R.S. 959

Addison's Disease with Diabetes Mellitus
IAN MCLEAN BAIRD, M.R.C.P.
D. S. MUNRO, M.R.C.P..... 962

Transference of Passive Immunity from Mother to Young
Prof. F. W. R. BRAMBELL, D.SC., F.R.S.
JOAN BRIERLEY, B.SC.
RONALD HALLIDAY, B.SC.
W. A. HEMMINGS, B.A..... 964

SPECIAL ARTICLES

Tuberculous Diabetics
GEORGE LUNTZ, M.R.C.P..... 973

Clinical Pathology..... 974

Small-list Doctors..... 975

MEDICAL SOCIETIES

Ophthalmological Society of the United Kingdom 965

REVIEWS

Notices of Books..... 966

LEADING ARTICLES

HAZARDS OF BROAD-SPECTRUM ANTIBIOTICS 967

SALICYLATES IN RHEUMATIC FEVER 968

PSYCHIATRIC EVIDENCE AT MURDER TRIALS 968

ANNOTATIONS

A Surgical Occasion..... 970
Virus Virulence..... 970
The New Epidemiology..... 970
Baker Street Diagnosis..... 971
Acute Osteomyelitis..... 971
Origin of Life..... 972

PUBLIC HEALTH

Maternal Rubella and Congenital Defects
C. METCALFE BROWN, M.D.
BARBARA NATHAN, B.M..... 975

Illnesses Treated in Hospitals... 976

A Smokeless Zone in Bolton.... 976

IN ENGLAND NOW

A Running Commentary by Peripatetic Correspondents... 977

LETTERS TO THE EDITOR

The Bombs (Dr. Alex Comfort; Dr. P. D'Arcy Hart; Dr. R. H. Dobbs)..... 978

Glucagon-free Insulin for Insulin-sensitivity Tests (Prof. G. E. Anderson, M.D.)..... 979

The Plight of Senior Registrars.. 979

Remuneration of Hospital Medical Staff (Dr. H. S. Fraser; Mr. N. L. Rowe, M.R.C.S., F.D.S.).. 979

Radioactivity of Tobacco and Lung Cancer (Mr. D. K. Mulvany, F.R.C.S.)..... 980

Treatment of Deafness (Mr. I. G. Robin, F.R.C.S.)..... 980

Administration of Penicillin (Dr. M. O. Raven)..... 981

Hæmolysis and Eclampsia (Mr. John Sophian, F.R.C.S.)..... 981

Estimation of Dinitro-ortho-cresol in Blood (Dr. E. F. Edson)..... 981

Hospital, Doctor, and Patient (Dr. F. Charlotte Naish)..... 982

Medical Terms (Dr. Ffrangcon Roberts) 982

White Nails (Dr. Charles Steer).. 982

Graduate Wives (Dr. Mary E. Lennox) 983

Repair of Large Herniæ with Nylon Mesh (Mr. R. I. Cohen, F.R.C.S.) 983

Estimation of Plasma-insulin (Dr. J. Vallance-Owen, Miss Barbara Hurlock, Mr. N. W. Please) 983

Treatment of Convulsions in Childhood (Dr. H. V. L. Finlay) 984

Textbook Illustrations (Mr. C. E. Engel, A.R.P.S.)..... 984

Prevention of Airborne Infection (Mr. A. Howard Baker, F.I.M.L.T.) 984

Hashimoto's Struma Lymphomatosa (Dr. R. T. Cooke, Dr. E. Wilder)..... 984

Trichobezoar (Dr. V. S. Mitcheson) 985

Heparin and Hyaluronidase (Dr. J. V. Garrett)..... 985

PARLIAMENT

Science to the Rescue..... 985
Committee on Homosexuality... 986
Pay of Mental Nurses..... 986
Question Time..... 987

OBITUARY

Ludwik Hirszfeld..... 987
Stuart Spence Meighan..... 988
John Edmund Bowen..... 988

NOTES AND NEWS

World Health Organisation 989
The Burden of Pensions..... 989
Smoking and Lung Cancer..... 989

University of Glasgow..... 990
Royal College of Physicians of London 990

Diary of the Week..... 988
Appointments..... 990
Births, Marriages, and Deaths... 988

IMPORTANT HEINEMANN BOOKS

MANUAL OF UROLOGY
By A. W. BADENOCH, MD FRCS 568 pages 328 illustrations £5 5s net

FIBROCYSTIC DISEASE OF THE PANCREAS
Edited by MARTIN BODIAN, MD 252 pages 133 illustrations 63s net

Fanconi & Wallgren's TEXTBOOK OF PÆDIATRICS
Edited by W. R. F. COLLIS, MA MD FRCP DPH 1124 pages 450 illustrations 20 pages of colour £7 7s net

EXTRASYSTOLES AND ALLIED ARRHYTHMIAS
By D. SCHERF, MD FACP, and A. SCHOTT, MD 530 pages 212 illustrations £5 5s net

Joll's DISEASES OF THE THYROID GLAND
Second Edition Edited by F. F. RUNDLE, MD FRCS 530 pages 165 illustrations 84s net

THE VITAMINS IN MEDICINE
Third Edition By F. BICKNELL, DM MRCP, and F. PRESCOTT, MSC PHD MRCP 792 pages 245 illustrations 70s net

PROGRESS IN VENEREOLOGY
By R. R. WILLCOX, MD 208 pages 30 illustrations 21s net

CLEFT LIP AND PALATE
By W. G. HOLDSWORTH, MB FRCS 137 pages 75 illustrations 35s net

HANDBOOK OF GYNÆCOLOGICAL DIAGNOSIS
By WALTER NEUWEILER, MD 448 pages 406 illustrations 16 coloured plates 80s net

CLINICAL ELECTROCARDIOGRAPHY
Fourth Edition By D. SCHERF, MD FACP, and L. J. BOYD, MD FACP 484 pages 292 illustrations 42s net

WM HEINEMANN · MEDICAL BOOKS · LTD 99 GREAT RUSSELL STREET LONDON WC1

OXFORD MEDICAL

PUBLICATIONS

PHARMACOLOGY

by J. H. GADDUM, *Sc.D., F.R.S., M.R.C.S., L.R.C.P.*

FOURTH EDITION 580 *pages* 89 *illustrations* **35s.** *net*

BACTERIOLOGY FOR MEDICAL STUDENTS AND PRACTITIONERS

by A. D. GARDNER, *D.M., F.R.C.S., F.R.C.P.*

FOURTH EDITION 280 *pages* 31 *illustrations* **12s. 6d.** *net*

PULMONARY TUBERCULOSIS

PATHOLOGY, DIAGNOSIS, MANAGEMENT AND PREVENTION

by WALTER PAGEL, *M.D.*
F. A. H. SIMMONDS, *M.D., D.P.H.*
and NORMAN MACDONALD, *M.B., M.R.C.P. (Ed.)*

THIRD EDITION 742 *pages* 317 *illustrations* **84s.** *net*

APPLIED PHYSIOLOGY

by SAMSON WRIGHT, *M.D., F.R.C.P.*
With the collaboration of
M. MAIZELS, *M.D., F.R.C.P., and* J. B. JEPSON, *M.A., B.Sc., D.Phil., A.R.I.C.*

NINTH EDITION 1206 *pages* 688 *illustrations* 4 *coloured plates* **50s.** *net*

THE CLINICAL APPLICATION OF ANTIBIOTICS: PENICILLIN

by M. E. FLOREY, *M.D.*

744 *pages* 222 *illustrations* 98 *tables* **84s.** *net*

TUBERCULOSIS OF BONE AND JOINT

by the late G. R. GIRDLESTONE
and
E. W. SOMERVILLE, *M.B., F.R.C.S. (Ed.)*

SECOND EDITION 322 *pages* 260 *illustrations* **45s.** *net*

OXFORD UNIVERSITY PRESS

ARTIFICIAL RESPIRATION BY INTERMITTENT POSITIVE PRESSURE IN POLIOMYELITIS AND OTHER DISEASES

A. CRAMPTON SMITH
M.B. Edin., D.A.
ANÆSTHETIST

J. M. K. SPALDING
M.A., D.M. Oxfd, M.R.C.P.
RESEARCH ASSISTANT, DEPARTMENT OF NEUROLOGY

W. RITCHIE RUSSELL
C.B.E., M.A. Oxfd, M.D. Edin., F.R.C.P., F.R.C.P.E.
NEUROLOGIST

RADCLIFFE INFIRMARY, OXFORD

THE commonest cause of death from poliomyelitis is respiratory insufficiency. This may be due to spinal paralysis affecting the primary muscles of respiration directly, and it is in such cases that tank respirators have proved of value. In other cases "bulbar" involvement leads to paralysis of the pharynx and larynx, and there is then grave danger of pharyngeal secretions or vomit being inhaled, and causing fatal pulmonary complications. In this type of case the skilled use of postural drainage often enables unobstructed breathing to be maintained (Russell 1952).

By far the most difficult and critical problem in management is presented by the "combined case," in which the paralysis is both bulbar and spinal. Some form of artificial respiration is then essential; yet, in spite of postural drainage, the uncompromising inspiratory effort of a tank respirator leads, in the absence of the power of swallowing, to inhalation of secretions and a fatal result. In some American clinics such patients have been nursed in tank respirators, with a tracheotomy; but this method involves great difficulties, notably in establishing an airtight seal at the neck without interfering with the tracheotomy.

Recently we have treated patients with combined bulbospinal paralysis by artificial respiration with intermittent positive pressure (I.P.P.), a method used by Lassen (1953) during the severe epidemic in Denmark in 1952. This method has great advantages, and we describe here how four patients were treated in a small Respiratory Unit established at Oxford to deal with cases of respiratory insufficiency. Not only cases of poliomyelitis but also cases of acute toxic polyneuritis were treated, and the unit has indeed been available for the treatment of respiratory insufficiency from any cause—e.g., after head injury or neurosurgical intervention, in drug intoxication, and in tetanus.

Case-records

The following cases are the first four we have treated in this way, and we hope that this description will be helpful to other workers.

FIRST CASE

On Aug. 17, 1953, a schoolgirl, aged 16, developed a heavy cold and cough beginning with a rigor. These symptoms disappeared within twelve hours, leaving her with a sense of lassitude. This persisted, and after nine days she developed a stiff neck; but, though feeling very unwell, she played tennis in the morning and afternoon.

Ten days after the onset she remained in bed, and during the day her legs became so weak that she could not stand. In the evening she was admitted to an isolation hospital, where she was found to have considerable weakness of all limbs, especially at the proximal joints. During the night she developed dysphagia, and her voice became only a whisper. She was seen by one of us (A. C. S.) on the morning of Aug. 28 and transferred in the prone position under his supervision to the Radcliffe Infirmary.

On admission [R.I. 179909] she was alert but very apprehensive. Her temperature was 97°F, pulse-rate 82, and respirations 26 per min. She could not swallow, her voice was a hoarse whisper, and she could not close her larynx. The other cranial nerves were normal. The diaphragm was weak, but the intercostal muscles contracted satisfactorily. There was considerable generalised weakness of all the limbs, but some movement was still present at all the joints.

Treatment

She was nursed in the prone and semi-prone or "tonsil" positions, and the head of the bed was tipped down 10–15° to ensure drainage of secretions from her mouth. During the next twelve hours her condition remained substantially unchanged, but at the end of that time her alæ nasi and accessory muscles of respiration were working. Her blood-pressure had risen from 130/75 to 160/80 mm. Hg, and she was becoming cyanosed.

An attempt was made to treat her in the Siebe Gorman modification of the Drinker tank respirator, in which a patient can be nursed in the prone or semi-prone positions. These positions were adopted, and the head was lowered 10–15°. The pharynx was aspirated frequently, but three cyanotic attacks during the night made it plain that this régime did not provide a clear airway, and that artificial

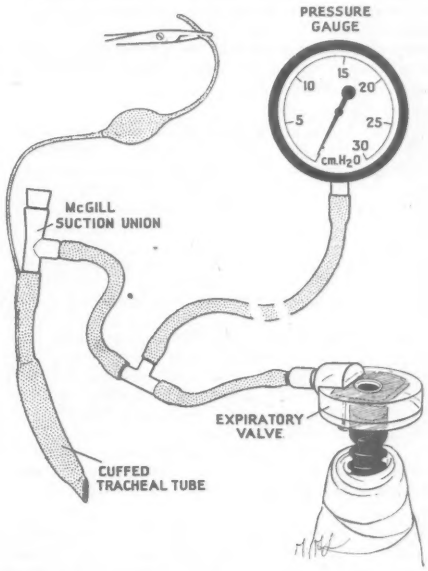


Fig. 1—Expiratory valve, pressure gauge, McGill suction union, and cuffed tracheal tube. End of lagged breathing-tubing from humidifier is also shown.

respiration was defeating its object by causing secretions to be inhaled.

We therefore decided to establish I.P.P. respiration through a cuffed tracheotomy tube. The patient was removed from the tank respirator, and the respiration was maintained with an Oxford inflator (Macintosh and Pratt 1939) and face-mask. Bronchoscopy was performed under thiopentone anæsthesia, and the bronchi were cleared of secretions. During this procedure I.P.P. respiration from the Oxford inflator was given as required down the bronchoscope. A cuffed endotracheal tube was then passed, and with it efficient I.P.P. ventilation was maintained. This enabled a formal and unhurried tracheotomy to be done; and, as the endotracheal tube was removed, a short cuffed tracheal tube (fig. 1) was inserted through the tracheostoma.

For four weeks thereafter the patient received I.P.P. respiration from Radcliffe respiration pumps A and B (Russell and Schuster 1953) through an expiratory ("flutter") valve * (fig. 2). A humidifier (Marshall and Spalding 1953) was used

* This valve was designed by Dr. F. D. Stott as an interim measure. He is of the opinion that it can be further improved.

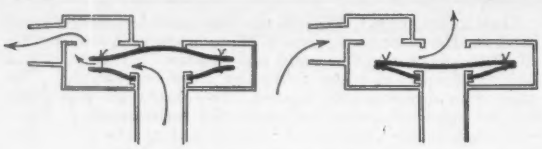


Fig. 2—Diagrammatic representation of mechanism of expiratory valve. Case is made of plastic, and valve of rubber.

to warm and humidify the gases to the extent which is found in the normal trachea. On the day after tracheotomy (the third since the onset of paralysis) the patient had complete paralysis of all voluntary movements throughout her body except external ocular movements.

Respiration

The respiratory exchange required was assessed by clinical judgment and by the patient's subjective reactions, which proved both sensitive and reliable. It is relatively easy to provide adequate oxygenation by the means used if there is no severe pulmonary collapse, but it is desirable to avoid over-ventilation and hence chronic respiratory alkalosis. Biochemical investigations indicate that this took place to some extent, as exemplified by the progressive rise in the pH of the urine (fig. 3).

A pressure-gauge included in the system close to the tracheal tube provided a continual visual check of pressure during inspiration and expiration.

Pulmonary Complications

Particular attention was paid to the early diagnosis of areas of pulmonary collapse. The chest was frequently examined clinically, and radiographs were taken almost daily for the first three and a half weeks. Indirect indications that some collapse had taken place were (1) anxiety on the part of the patient; (2) her dissatisfaction with a setting of the respirator which had previously satisfied her; (3) increase in the pressure shown on the gauge; or (4) increase in the pulse-rate. Direct indications of collapse were obtained by auscultation and radiography. From the fourth day after I.P.P. respiration was begun the patient received vibration and light percussion to the chest from a physiotherapist. This was done every four hours, during the acute stage; and, when any degree of collapse occurred, particular attention was directed to the lobe concerned. The trachea and bronchi were aspirated during physiotherapy, and Tiemann's catheters proved very suitable for this. If these measures failed to clear the airways bronchoscopy under thiopentone anæsthesia was performed; but with increasing experience it came to be required less and less often.

Blood-pressure

Throughout the acute stage the blood-pressure was measured half-hourly. This provided an early indication of inadequate ventilation, which causes the blood-pressure to rise promptly owing to retention of carbon dioxide. It also demonstrated the mechanism of sudden episodes of unconsciousness, which first came on during the early morning of Aug. 30, when the patient had been having I.P.P. respiration for thirteen hours. In these episodes, without warning, she became unrousable, and at the same time her blood-pressure fell from the normal level of 125/75 mm. Hg to a systolic level of 80–60 or less. Her pulse-rate, which was consistently above 90 during the first four weeks of the illness, was unchanged or fell slightly during these hypotensive attacks (fig. 4). These attacks lasted from a few minutes to a few hours; and, as soon as she became rousable, her level of consciousness returned to normal, as though she were awakening from sleep. It was impossible to correlate these attacks with any change in the artificial respiration, and they were characterised by a sudden fall in blood-pressure in constrast to the rise that is typical of under-ventilation.

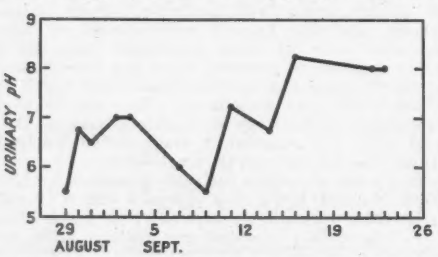


Fig. 3—Urinary pH in case 1, showing rise to maximum of 8·3 attributable to respiratory alkalosis caused by over-ventilation.

Feeding

As soon as the cuffed tracheotomy tube was in place the pharynx was closed from the bronchial tree, and the possibility that the patient might vomit was no longer alarming. She was fed through a 'Polythene' stomach-tube (size 3 or 4). At first she received 4-oz. feeds hourly, comprising milk 2 oz., water 1 oz., Ringer-Fischer solution 1 oz., and two level teaspoonfuls of glucose (10 g.). No residuum could be aspirated from the stomach an hour after each feed, and twenty-four hours later an extra ounce of milk was added to each feed. On this régime an ounce or two of fluid could be aspirated occasionally, but nearly 6 pints was absorbed daily, and the specific gravity of the urine fell rapidly (fig. 5). On the seventh day of paralysis, the fluid balance having been restored to normal and absorption being good, 8 oz. of the feeds was given two-hourly, and next day were started two-hourly 8-oz. feeds of "higher protein diet no. I" (Higgins et al. 1954). The increase in dietary protein was followed by a rise in the blood-urea level (fig. 5). When this had again fallen to 40 mg. per 100 ml., "higher protein diet no. II" was begun. The patient remained on this with some additions by mouth until Sept. 25, a month after the onset, when she could be fed entirely by mouth. While she was on these diets, the electrolyte balance was maintained by varying the amount of Ringer-Fischer solution used to dilute the feeds according to the plasma-chloride level.

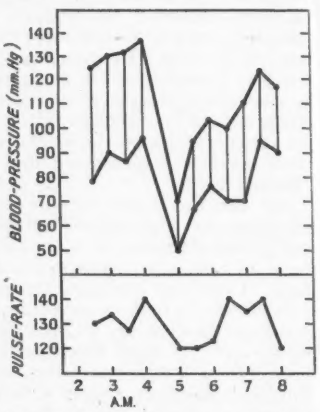


Fig. 4—Blood-pressure and pulse-rate in case 1 during first and longest hypotensive attack (on Aug. 30).

Drugs

Large doses of antibiotics were given, mainly penicillin but also aureomycin when bronchial swabs grew penicillin-resistant organisms. Sedation was produced at first with phenobarbitone and later with chloral hydrate.

Nursing

The patient was nursed on a tipping bed with its head about 10° down. She remained mainly in the two lateral positions and sometimes in the theoretically better semi-prone position. The last, however, she found very uncomfortable. She was turned every two hours throughout her illness, and the routine for turning during the acute stage was as follows: (1) the trachea and bronchi were aspirated; (2) the expiratory valve was changed; (3) the patient was turned; and (4) the trachea and bronchi were aspirated again. The act of turning often liberated a considerable amount of secretions. Every four hours, at alternate turnings, vibration and percussion were given to the chest by a physiotherapist at stages 1 and 4. At alternate turnings, when physiotherapy was not being given, the bed was tipped steeply head down, the pharynx was aspirated, and the cuff of the tracheal tube was deflated. After a minute the cuff was reinflated enough to prevent air from leaking past it, and the bed was returned to its usual tilt of 10°.

Investigations

Radiographic investigations have already been referred to. Cerebrospinal fluid (Sept. 7): no cells; protein 150 mg. per 100 ml. Electrocardiogram (Sept. 1 and Oct. 1): sinus tachycardia. Urine (twenty-four-hour specimen Oct. 5): coproporphyrin excretion less than 40 µg.; no porphobilinogen. Paul-Bunnell test (Oct. 30): negative.

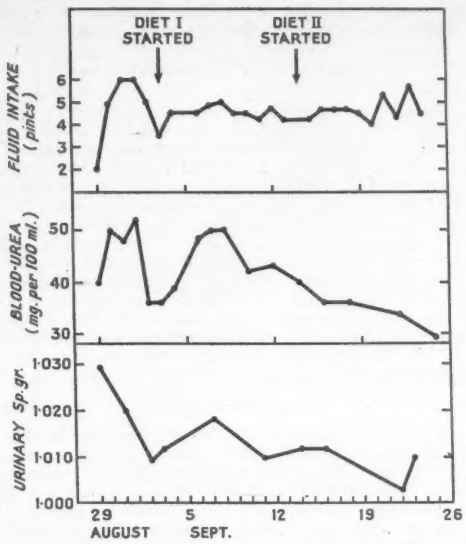


Fig. 5—Fluid intake, blood-urea level, and specific gravity of urine in case 1

Progress

On Aug. 30 the patient had total paralysis of all voluntary movements except external ocular movements, and this persisted till Sept. 2, when feeble rotation of the neck became possible. Thereafter muscle power throughout the body rapidly recovered. By Sept. 21 she could breathe unassisted for thirty-five minutes, and the partial recovery of facial as well as other muscles made it easier to communicate with her. Sensory testing now showed that she had considerable loss of appreciation of posture and vibration in all her limbs, and some peripheral superficial sensory loss, considerable on the feet and slight on the hands. By Sept. 30 she could breathe unassisted. The cuffed tube was removed, and a Durham's tube was substituted. A few days later the tracheotomy was allowed to close.

She was discharged home on Nov. 18, and on March 11, 1954, her tendon reflexes were diminished, but there were no other abnormalities.

Diagnosis

In view of the profound lower motor-neurone paralysis, the peripheral sensory loss, and the large amount of protein in the C.S.F., a diagnosis of acute toxic polyneuritis was made, and her complete recovery was in accordance with this.

SECOND CASE

On Sept. 7, 1953, a schoolgirl, aged 13, developed pyrexia (100°F) and felt "a lump in her throat." Her appetite was poor, but she ate and drank at all meals. Two days later she drank about 10 oz. at breakfast with some difficulty and thereafter developed complete paralysis of swallowing. She was admitted to another hospital that evening and was found to have, besides dysphagia, weakness of the left face, the palate, the sternomastoid muscles, and the muscles of the shoulder girdles and upper arms. Anterior poliomyelitis was diagnosed.

Next morning she had a cyanotic attack which rendered her temporarily unconscious. She was lying supine at the time, and it seems likely that it was due to inhalation of secretions or of vomit, fluid being aspirated from her nasopharynx. A similar attack occurred three hours later. She was first seen by one of us (J. S.) four hours after the second attack. She did not respond to painful stimuli, and her respirations were extremely shallow and irregular at a rate of about 14 per min. She was receiving 100% oxygen through a mask, and her colour was satisfactory, but her ventilation was manifestly too small to prevent retention of carbon dioxide.

Treatment

A cuffed endotracheal tube was introduced and respiration maintained with an Oxford inflator. The patient was transferred in this way by ambulance to the Radcliffe Infirmary, a journey of some fifty minutes. During the journey she began to move her limbs and to open her eyes when told to do so.

On admission [R.I. 180349] bronchoscopy was performed, but no considerable amount of inhaled material was within reach. It was thought that when she recovered from the effects of under-ventilation she might be able to breathe spontaneously. An endotracheal tube was therefore replaced, and positive-pressure respiration was instituted down this tube from Radcliffe respiration pump A.

Next day an attempt was made to let her breathe spontaneously, but she could not. A formal tracheotomy was therefore done as in case 1, and I.P.P. respiration continued with Radcliffe respiration pump A. Two hours later, twenty-two hours after I.P.P. respiration was begun, her blood-pressure dropped to 40 mm. Hg systolic, her nail-beds and subsequently her lips became deeply cyanosed, and she died.

Investigation

Radiography of the chest on admission had showed mottled shadowing throughout the lung fields.

Necropsy Findings

The diagnosis of anterior poliomyelitis was confirmed. The endotracheal tube had been in position for twenty hours, and there was considerable ulceration of the larynx. An intense hæmorrhagic consolidation involved about five-sixths of the lungs, and the relatively normal fifth was situated anteriorly. Presumably this hopeless state of the lungs was a consequence of secretions, and perhaps vomit, being inhaled on the day before death.

THIRD CASE

On Oct. 11, 1953, a schoolgirl, aged 17, developed a slight cold in the head. On Oct. 16 she noticed numbness and paræsthesiæ of both feet and the left hand. She was admitted to another hospital and three days later developed some weakness of the left upper and lower limbs and left side of the face, which was greater next day, when diplopia also developed. There was slight enlargement of the glands of the neck, a blood film showed atypical glandular-fever cells, and a positive Paul-Bunnell test subsequently confirmed the diagnosis of infective mononucleosis with the rare complication of acute toxic polyneuritis.

On Oct. 22 she had a brief cyanotic attack after vomiting, and soon afterwards developed manifest dysphagia. On Oct. 24 her intercostal muscles and diaphragm became weak and, when she was first seen by two of us that afternoon, her respirations were very shallow and she was cyanosed. Within twenty minutes the cyanosis increased, she sweated profusely, and consciousness became impaired.

Treatment

An endotracheal tube was passed, respiration was maintained with an Oxford inflator, and she quickly became alert. Under this form of positive-pressure respiration she was transferred by ambulance to the Radcliffe Infirmary, a journey of one and a quarter hours, without incident.

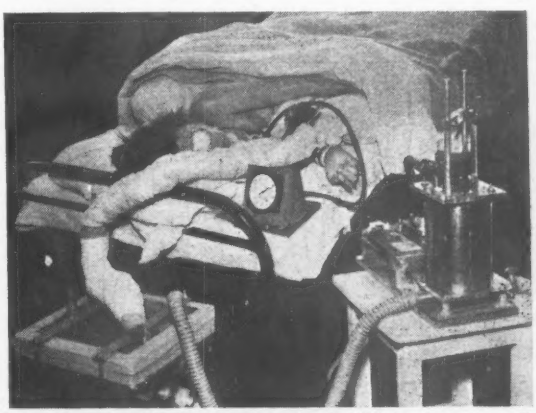


Fig. 6—Case 3 receiving treatment, showing Radcliffe respirator pump B, humidifier, lagged breathing-tube, expiratory valve, and pressure gauge. Patient's head is at "foot" of bed, where rail is lowest.

On admission [R.I. 182462] bronchoscopy was performed under thiopentone anæsthesia, and the bronchi were cleared of secretions. An endotracheal tube was replaced, tracheotomy was performed, and a cuffed tracheal tube was inserted. Respiration was maintained with Radcliffe respiration pump B, and subsequently respiration pump A, through a humidifier and expiratory ("flutter") valve (fig. 6).

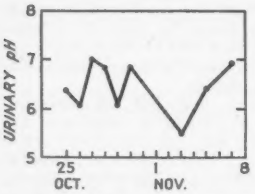


Fig. 7—Urinary pH in case 3. Urine remained slightly acid, indicating that ventilation was not excessive.

At this stage, besides complete paralysis of the intercostal muscles and diaphragm she had bilateral impairment of ocular movements, a severe left and moderate right facial weakness, gross weakness of the tongue, weakness of both upper limbs, which was severe at and below the right elbow and moderate elsewhere, and severe weakness of both lower limbs. No objective sensory loss was demonstrable at this stage, but by Oct. 29 peripheral sensory impairment to light touch was demonstrable on the hands and feet.

Respiration

The respiratory exchange was more satisfactorily controlled than in case 1, and the urinary pH showed no constant trend in either direction, remaining between 5·6 and 7·0 (fig. 7).

Since the volume of gas delivered by a pump does not satisfactorily indicate the volume of air actually ventilating the patient, we collected the expired air with a spirometer and an expiratory valve with a suitable connecting-piece on the expiratory side. The patient required 7–8 litres per min. to maintain equilibrium.

Pulmonary Complications

There were poor air entry and radiographic opacity at the left base before I.P.P. respiration was begun. Four-hourly percussion and vibration to the chest were begun at once, and the pulmonary condition never gave rise to alarm. The value of physiotherapy was well illustrated on one occasion when air entry disappeared over the left lower lobe. Percussion and vibration enabled a plug of mucus to be aspirated with a Tiemann's catheter, and air entry was immediately restored.

Blood-pressure

No hypotensive attacks occurred. The blood-pressure was usually about 100/55 mm. Hg. On her first day the patient was receiving respiration at 5·6 litres per min., and her blood-pressure gradually rose, indicating under-ventilation, and settled again when respiration was increased to 8 litres per min. (fig. 8).

Feeding, Drugs, and Nursing

In feeding, the same principles were followed as in case 1. Milk, water, and glucose were given for the first day and a half; and thereafter, since the blood-urea level was normal and fluid was well absorbed from the intestine, "higher protein diet no. I" was begun. The resulting rise in blood-urea to 56 mg. per 100 ml. settled within two days, and six days after her admission to this hospital she began to receive "higher protein diet no. II."

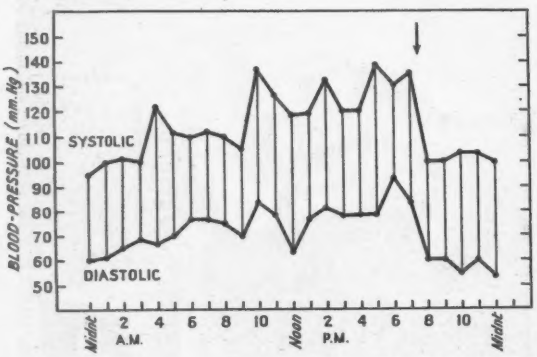


Fig. 8—Blood-pressure in case 3, beginning 6 hours after I.P.P. respiration was begun. At arrow, ventilation was increased from 5·6 to 8 litres per min.

She received penicillin and chloral hydrate. A course of aureomycin was stopped after two days, owing to a mild toxic reaction.

The same nursing routine was applied as in case 1.

Progress

On the fifth day after I.P.P. respiration was begun the first signs of recovery were observed. She could make a few feeble respiratory movements, and there was a little recovery of the cranial nerves and the right deltoid muscle. Muscle power recovered quickly, with the result that on Nov. 3 she could breathe spontaneously for ten minutes. By Nov. 10 she required no respiratory assistance, the tracheal tube was removed, and the tracheostoma was allowed to close. There was still impaired sensation of light touch and pinprick in a "glove-and-stocking" distribution in all her limbs and considerable impairment of vibration sense and appreciation of passive movement in the lower limbs. By Dec. 9 she was walking about, and the only abnormalities were slight weakness of the left shoulder and hand, the pelvic girdle, and quadriceps muscles. Complete recovery took place later.

FOURTH CASE

A well-built man, aged 32, developed a headache on Nov. 5, 1953, and next day complained of weakness of his right arm. During the next night he had dysphagia and respiratory difficulty. He was first seen by two of us next morning, when he was breathing with difficulty and became cyanosed on the slightest exertion. His pharynx contained a pool of secretion, and there was no air entry over the left lower lobe. There

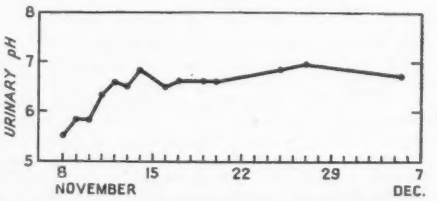


Fig. 9—Urinary pH in case 4. Initial rise is due to rehydration of patient. Thereafter pH remains slightly acid, indicating that ventilation is not excessive.

was very little movement of the left chest, and paradoxical movement on the right side indicated that the right diaphragm was functioning but the right intercostals were not. There was generalised weakness of the right upper limb, less marked weakness of the left upper limb, and a moderate weakness of both lower limbs. The ankle-jerks were the only tendon reflexes obtainable. There was no sensory loss. The C.S.F. (examined elsewhere) contained protein 95 mg. per 100 ml. and 405 cells per c.mm. (lymphocytes 347, polymorphs 45, macrophages 12). A diagnosis of anterior poliomyelitis was made.

Treatment

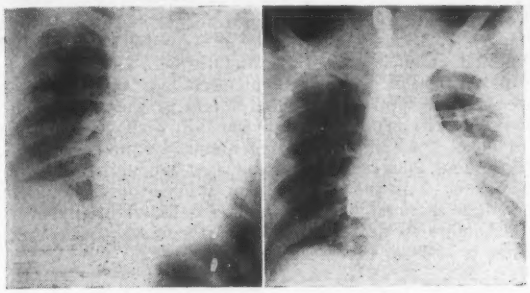
He was transferred to the Radcliffe Infirmary by ambulance under the supervision of one of us (A. C. S.)—a journey of thirty-five minutes. An endotracheal tube was not passed, but apparatus for intubation and I.P.P. respiration was available in the ambulance.

On admission [R.I. 183157] bronchoscopy was performed under thiopentone anæsthesia with succinylcholine iodide, and a considerable quantity of secretions was removed from the bronchi. An endotracheal tube was then passed, a tracheotomy was done, and I.P.P. respiration established with Radcliffe respiration pump A through a humidifier and expiratory valve as in the previous cases.

Next day the paralysis of the limbs had increased considerably. A trace of movement persisted in the right diaphragm, but the vital capacity was only 200 ml.

Respiration

This patient was known to have a psychopathic personality with hysterical features, and his subjective sensations were worse than useless as a guide to adequate ventilation, because he contradicted himself. For the first fourteen hours he received ventilation of 7·5 litres per min. This was thought insufficient in view of an estimated partial pressure of carbon dioxide in capillary blood of 60 mm. Hg, and the ventilation was increased to 9·8 litres per min. Thereafter he continued to receive about 10 litres per min, and this kept him almost



a *b*

Fig. 10—Case 4: *a*, on admission; *b*, 5 days later, showing resolution of severe abnormalities on left side.

in respiratory equilibrium, judged by his blood chemistry and urinary pH (fig. 9).

Pulmonary Complications

The abnormalities at the left base, which were considerable when he was first seen, cleared up with routine physiotherapy and suction, and no serious pulmonary complication developed (fig. 10).

Blood-pressure

There were no hypotensive attacks. For the first week the patient's blood-pressure remained about 110/60 mm. Hg, but thereafter it began to rise very gradually; two weeks later it was between 140/100 and 200/130. The ventilation was increased from 10 litres to 13 litres per min. for twelve hours, and this produced biochemical evidence of hyperventilation but did not lower the blood-pressure. The hypertension gradually diminished, and two months after the onset the blood-pressure was 130/80.

The patient's psychiatric abnormalities made it difficult at times to interpret changes in blood-pressure. For instance, when he was being weaned from artificial respiration, his blood-pressure used to rise sharply as soon as the pump was turned off. Within half an hour it returned to its previous level and he would often fall asleep. Clearly this hypertension was psychogenic, and not the result of carbon-dioxide retention.

Feeding, Drugs, and Nursing

The same principles were applied as in cases 1 and 3.

Progress.—By Nov. 28 he could breathe spontaneously for five and a half hours out of the twenty-four and by Dec. 28 he could breathe unassisted by day and night.

Discussion

The method of artificial respiration used for these patients has three great advantages: first, a cuffed tube inserted through a tracheotomy wound separates the pharynx from the trachea so that there is no danger of inhalation of foreign material even if the patient vomits; second, it permits secretions to be aspirated readily from the trachea and bronchi; third, it provides a route for artificial respiration by I.P.P. with the attendant advantages, compared with respiration in a tank, of ready access to the patient and of low cost of apparatus.

Patients with paralysis causing respiratory embarrassment are critically ill, but, as illustrated above, if they survive, even those with both bulbar and spinal involvement may make an excellent recovery. Their treatment is a specialised matter and presents many problems which are not commonly met with in other branches of medicine. It is therefore best carried out in a special unit whose doctors and (very important) whose nurses are experienced in treating this type of case. A considerable staff of doctors and nurses is required to give adequate treatment in the acute stage; and, since the number of cases requiring treatment, and therefore the number of staff required, varies greatly from time to time, a unit that is to treat such cases is most conveniently situated in a large hospital which can support a drain on its resources. Moreover it is in large hospitals that the ancillary services required are available.

This recommendation is in accordance with the policy put forward by the Royal College of Physicians (1953) and the Ministry of Health (1953). Whether the unit should be situated at a general hospital or a hospital for infectious diseases depends on local conditions.

TRANSPORT

A patient with paralysis may develop respiratory embarrassment with little warning, and this may happen when the patient is at home or in a hospital which has neither the equipment nor the organisation to deal with this condition. This fact has in the past militated against the formation of special units for these patients, but it now appears that it is relatively simple to transport them. Any unit intending to treat cases of this type must be prepared to send out a team, consisting of an anæsthetist and a physician, to provide for the safe transport of the patient. This team must be prepared to intubate the trachea with a cuffed endotracheal tube under either local or general anæsthesia, and to provide a portable source of I.P.P. respiration and of suction. The Oxford sucker-inflator unit (supplied by M.I.E. Ltd., 12, New Cavendish Street, London, W.1) has proved very suitable for this purpose. The requisite equipment can be carried in any car and should be kept ready for immediate use. It will often be unnecessary to intubate the patient for transport, as in cases 1 and 4, but it is nevertheless essential for the anæsthetist to travel with the patient in the ambulance and to be prepared to intubate if necessary.

For transport, we prefer intubation through the mouth to tracheotomy, since it enables the patient's condition and therefore the need for tracheotomy to be reassessed after a period of satisfactory ventilation. Moreover, if tracheotomy is required, a formal and unhurried operation can most easily be performed in the respiratory unit by a surgeon experienced in this operation. Tracheotomy must not, however, be unnecessarily delayed, owing to the danger of ulceration of the larynx if an endotracheal tube is left in situ for even a few hours.

I.P.P. RESPIRATION

The circuit used was an open circuit with no rebreathing, and it supplied air 100% saturated with water vapour at 36°C. Additional oxygen was sometimes used. We attempted to maintain a ventilation-rate appropriate to the patient's need without excessive inspiratory pressures. During the expiratory phase tracheal pressure was atmospheric, and expiration slightly exceeded inspiration in length.

Respirators

To provide I.P.P. respiration Lassen (1953) used a semi-closed system and relied on students to squeeze an anæsthetic bag supplied from cylinders containing oxygen and nitrogen. We have used Radcliffe respiration pumps A and B (made by H. G. East & Co., Longworth Road, Oxford) (Russell and Schuster 1953) to supply positive pressure. These pumps are easy to adjust to the patient's needs, and eliminate any risk of accidental overdistension of the lungs. They give a rapid rise in pressure at the beginning of inspiration

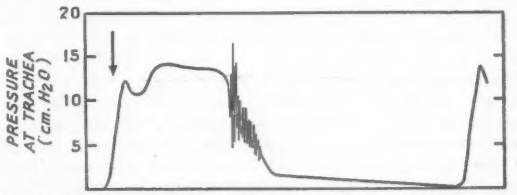


Fig. 11—Pressure record at trachea taken with a condenser manometer, with Radcliffe respiration pump A at 20 respirations a minute. Rapid rise in pressure at start (arrow) of inspiration is a feature of this pump.

(fig. 11), which ensures that the lungs are well filled for the greater part of inspiration. Maloney et al. (1953) advocate a machine which provides negative pressure during expiration. We have not had the opportunity of testing such a machine, but there is need for further study of the effects of different pressures and rates of change of pressure during both expiration and inspiration. Unfortunately the records illustrated by these workers show that this machine was compared with another which permitted only gradual expiration and with which the expiratory pressure did not fall below 5 cm. water.

Though oxygen or any other gas can be delivered by Radcliffe respiration pumps they normally use room air, which possesses the great advantage of being readily available. Lassen (1953) has described the difficulties and expense of maintaining a supply of gas cylinders when he used hand-operated I.P.P. respiration. The same problem arises in respiratory machines (Bang 1953, Macrae et al. 1953, Pask 1953) which rely for their motive power on the pressure from a cylinder of compressed gas.

Humidifier

The value of humidification to keep secretions fluid has been emphasised by Lassen (1953). It is physically impossible to produce humidification that in any way simulates that obtaining in the normal trachea, unless the humidifier also warms the air and is placed between the respirator and the patient. The simple apparatus described by Marshall and Spalding (1953) has proved satisfactory. When it has been in use, secretions have remained moist and were readily removed by aspiration. When the patients were being weaned from the respirator and were breathing spontaneously through the tracheal tube, sticky secretions sometimes occurred, and the patients complained of discomfort and difficulty in breathing, which was relieved by further humidification. To obviate this a plastic bag was placed loosely over the free end of the tracheal tube, and the pump was used to blow humidified air into it. This device enabled the patient to breathe warm humidified air mixed with room air and has facilitated the weaning phase.

Expiratory Valve

The most important feature of an expiratory valve is that it should permit perfectly free expiration; for, if the tracheal pressure does not fall to atmospheric in expiration, there is a deleterious effect on the circulation (Werkö 1947, Cournand et al. 1948, Motley et al. 1948). For this reason any form of expiratory apparatus which depends for its proper functioning on introducing resistance cannot be regarded as satisfactory. The "flutter" valve (made by Owen Mumford & Co. Green Place, Abingdon Road, Oxford) used in these cases has proved adequate. To ensure rapid opening of this type of valve to the expiratory position negative pressure from the respirator is necessary, and a non-return valve on the delivery side of the respirator must therefore not be used.

Pressure Gauge

The use of a pressure gauge (made by K. D. G. Instruments Ltd., Purley Way, Croydon) close to the tracheostoma has proved of special value because it provides a continual visual check on the working of the I.P.P. system. It shows that in inspiration the maximum safe intrapulmonary pressure is not being exceeded, and in our experience pressures above 20 cm. water are rarely required. It also gives positive evidence that the expiratory valve is opening freely. Moreover a change in the readings gives an early indication that something is wrong. A rise in pressure suggests pulmonary complications, and a fall a leak in the system, either outside the patient or beside the tracheal cuff. In either case early treatment will avoid serious mishaps.

Tracheal Tube

We have used cuffed endotracheal tubes cut to a length of about $4^1/_2$ in. At the external end a McGill suction union is connected, and through the opening in this, which is normally kept occluded, aspiration can readily be applied. The lower end of the tube is also cut short immediately below the cuff, with the minimum of bevel, for this end reaches almost to the carina and, if too long, can easily enter the right bronchus, occluding the left. For the same reason tracheotomy should be as high as possible. The cuff is deflated briefly every four hours to protect the tracheal mucosa, and a fresh tube is inserted every three or four days.

Ventilation

The dangers of inadequate ventilation with hypoxia and retention of carbon dioxide are well recognised. Those of over-ventilation are not at present well defined. There are extremely sensitive mechanisms in the normal person which prevent over-ventilation, and if it occurs it produces profound alterations in body electrolytes. It therefore seems highly unwise to induce over-ventilation in a sick person, whose ability to compensate may be impaired or who may not be in a condition to withstand a change in ionic balance. The importance of maintaining electrolyte equilibrium has been increasingly appreciated in recent years in other serious conditions—e.g., diabetic coma, the postoperative state, and severe injury—and should not be neglected in this instance.

It is not easy to assess when adequate ventilation is being provided, and the patient's subjective sensations, often a most useful guide, are not available in the most difficult instances—i.e., in the acute stage, when the patient may be unconscious or incapable of coöperation, and in children. Objective criteria are therefore desirable.

We have measured in a spirometer the volume of air expired each minute, and have found this a valuable procedure. Cases 1 and 3, girls aged 16 and 17, of slight build, required 7–8 litres per minute, whereas case 4, a heavily built labourer, required about 10 litres per minute. In all the cases the respiratory rate was 16–20 per minute. A minute volume that is approximately correct can thus be assured, and it can be adjusted in the light of the patient's progress. Slight under-ventilation can be detected by a gradual rise in blood-pressure, and over-ventilation by a rise in the urinary pH. The conclusions drawn from these estimations may be confirmed by investigating the blood chemistry.

Pulmonary Complications

Patients with bulbospinal paralysis are extremely liable to pulmonary complications since they cannot cough and rid themselves of their secretions. Prophylaxis and early treatment are essential, and the following prophylactic measures have been adopted.

(1) Two-hourly changes of posture from one side to the other; these often loosen secretions so that they can be easily aspirated.

(2) Four-hourly vibration and percussion by a physiotherapist; these to a considerable extent took the place of the normal cough in removing secretions.

(3) Aspiration of trachea and bronchi with Tiemann's catheter, whenever secretions are present. This catheter is rather stiff and has a curved tip by which it is possible, with the patient lying on, say, the right side, to pass the catheter into the bronchi of the left (uppermost) lung which is receiving physiotherapy.

(4) Hydration of the patient and humidification of the inspired air. In this way the secretions are kept fluid and easy to aspirate.

(5) Antibiotic therapy.

In the presence of established pulmonary collapse these measures were intensified. If they failed, bronchoscopy was performed, but the need for this became less and less frequent as experience was gained.

Although bronchoscopy through the tracheostoma is easy, it proved impossible to ventilate an apnœic patient adequately through a bronchoscope in this situation, because of leaks round the instrument. Bronchoscopy was therefore performed through the mouth, with the tracheostoma temporarily occluded. Thiopentone anæsthesia, with or without relaxants and with intermittent inflation with oxygen, proved satisfactory.

BLOOD-PRESSURE

Lassen (1953) found frequent records of the blood-pressure a useful guide to correct ventilation, since carbon-dioxide retention is quickly reflected in a rise in blood-pressure. Although in some circumstances the significance of changes in blood-pressure was sometimes difficult to determine, in most instances valuable information was obtained from half-hourly records.

FEEDING, DRUGS, AND NURSING

Feeding.—With a cuffed tube in the trachea the bronchial tree is separated from the pharynx, and the dangers and deficiencies of parenteral nourishment, which may have to be faced in some cases of dysphagia without respiratory weakness, can be avoided. Polythene nasal tubes are less irritating than rubber and require changing less frequently. In an illness of the severity and duration of most cases of bulbospinal paralysis it is important that nourishment be adequate. Not only must the intake of fluid and calories be satisfactory, but also the diet should be mixed and contain as much protein as can be metabolised, judged by the blood-urea level. We have used the diets described by Higgins et al. (1954), which provide 2200 calories or more daily. They were diluted with water or with Ringer-Fischer's solution as biochemical investigations indicated.

Drugs.—Antibiotics are required in full doses. Sedation is necessary, especially in the early stages, and chloral hydrate and phenobarbitone have both been used.

Nursing.—A severely paralysed patient requires a great deal of careful nursing, and I.P.P. respiration allows completely free access to the patient, in striking contrast to artificial respiration in a tank respirator. Patients must be nursed on a bed that can be easily tipped. They will often be slightly head down, and therefore care of the skin over the acromioclavicular joint is especially important. Since it is not one of the classical pressure areas it is liable to be overlooked.

At least two nurses are required to turn a badly paralysed patient, and during the acute stage it has been our practice to have a doctor attending to respiration during turning, and readily available at all times.

Summary

"Combined" paralysis of both the pharynx and the muscles of respiration presents a very difficult problem in treatment, for which careful preparation is desirable.

This requires the organisation of small units in a well staffed hospital, members of which are prepared to act as a mobile team to transport patients safely under conditions of full control of respiration. The transport of such patients is usually safe even when they are completely paralysed.

The method introduced by Lassen (1953) of artificial respiration by intermittent positive pressure via a cuffed tracheotomy has been found satisfactory, and four cases are described.

This method with respiration pumps now available promises to be the method of choice in the treatment of this most critical group of cases.

We are specially indebted to Mr. R. G. Macbeth, director of the department of otorhinolaryngology, Radcliffe Infirmary, for his assistance in the development of this unit. In addition, we were most dependent on expert assistance unstintingly provided by many anæsthetists, E.N.T. surgeons, biochemists, physicians, physiotherapists, and nurses, at all hours of the day and night. Dr. G. S. Dawes kindly took the pressure record in fig. 11.

REFERENCES

Bang, C. (1953) *Lancet*, i, 723.
Cournand, A., Motley, H. L., Werkö, L., Richards, D. W. (1948) *Amer. J. Physiol.* **152**, 162.
Higgins, G., Lewin, W., O'Brien, J. R. P., Taylor, W. H. (1954) *Lancet*, i, 61.
Lassen, H. C. A. (1953) *Ibid*, i, 37.
Macintosh, R. R., Pratt, C. L. G. (1939) *Ibid*, i, 206.
Macrae, J., McKendrick, G. D. W., Claremont, J. M., Sefton, E. M., Walley, R. V. (1953) *Ibid*, ii, 971.
Maloney, J. V. jun., Elam, J. O., Handford, S. W., Balla, G. A., Eastwood, D. W., Brown, E. S., Ten Pas, R. H. (1953) *J. Amer. med. Ass.* **152**, 212.
Marshall, J., Spalding, J. M. K. (1953) *Lancet*, ii, 1022.
Ministry of Health (1953) National Health Service circular R.H.B.(53)75.
Motley, H. L., Cournand, A., Werkö, L., Dresdale, D. T., Himmelstein, A., Richards, D. W. (1948) *J. Amer. med. Ass.* **137**, 370.
Pask, E. A. (1953) *Lancet*, ii, 141.
Royal College of Physicians (1953) Second interim report of Committee on Poliomyelitis: see *Lancet*, ii, 294.
Russell, W. R. (1952) *Edinb. med. J.* **59**, 530.
— Schuster, E. (1953) *Lancet*, ii, 707.
Werkö, L. (1947) *Acta med. scand.* suppl. no. 193.

SIDE-EFFECTS OF OXYTETRACYCLINE THERAPY

PETER HAY
M.B. Glasg.
MEDICAL REGISTRAR

PETER MCKENZIE
M.B. Glasg., D.P.H.
CONSULTANT PHYSICIAN

BELVIDERE INFECTIOUS DISEASES HOSPITAL, GLASGOW

OXYTETRACYCLINE (terramycin) has been used in this hospital to treat gastro-intestinal infections and other susceptible infections when another antibiotic has been unsuccessful. The dosage given to children was 20 mg. per kg. of body-weight daily in four equal divided doses. The course lasted five days in every case except where the oxytetracycline was discontinued owing to side-effects. The dose given to patients aged 12 years or more was 2 g. daily, and this was the largest dosage used. The oxytetracycline was given with copious fluids, usually milk. Vitamin-B supplements were also given.

Not unnaturally side-effects were observed in some cases, showing once more that antibiotics upset the complex host-parasite-drug relationship, of which we know relatively little.

Most reports on oxytetracycline toxicity refer to nausea, vomiting, heartburn, diarrhœa, and headache as the most common manifestations; but we decided not to include these symptoms per se, because in most cases it was difficult to determine whether such symptoms were signs of the initial disease or of drug disturbance. Another reason is that many of our patients were infants and therefore unable to complain of minor symptoms. 2 cases of acute gastro-enteritis are included, however, for reasons that will be made clear below. Also, patients exhibiting other syndromes have had concomitant vomiting and diarrhœa.

The clinical syndromes observed during the treatment of 603 patients with oxytetracycline in the fourteen months from October, 1952, to December, 1953, are shown in table I.

Illustrative Case-histories

SYNDROMES ASSOCIATED WITH COAGULASE-POSITIVE *Staphylococcus aureus*

Group I: Fulminating Gastro-enterocolitis

Case 1.—A girl, aged 6 years, was admitted as a carrier of *Salmonella typhimurium*. She was physically well. On the fourth day of oxytetracycline administration she developed

TABLE I—CLINICAL SYNDROMES DEVELOPING DURING OXYTETRACYCLINE THERAPY

Group	No. of cases	*Staph. aureus*	
		Isolated	Not isolated
I: fulminating gastro-enterocolitis ..	2	1	1
II: sore throat			
With rash—i.e., staphylococcal scarlet-fever syndrome	7	6	1
Without rash	8	3	5
III: no throat lesion			
With rash—i.e., "surgical" or extrafaucial staphylococcal scarlet-fever syndrome	1	1	0
Without rash	3	3	0
Totals of groups I–III	21	14	7
Group IV: pyrexia as sole clinical feature	24	0	24
Group V: urticaria	3	0	3
Group VI: transient erythema ..	4	0	4
Totals of groups IV–VI	31	0	31

a pyrexia of 99°F, with a little vomiting and green diarrhœa. On examination she had inflamed fauces, with white patches of exudate. Oxytetracycline was discontinued. That day the pyrexia increased to 102°F. The child had twelve loose stools in twenty-four hours, but she developed intense peripheral circulatory failure next morning and died twenty-four hours after onset of diarrhœa.

Necropsy findings.—Patchy areas of early inflammation were seen in the stomach, duodenum, jejunum, ileum, cæcum, ascending colon, and descending colon. The appearances did not indicate gross damage. The stools contained a considerable amount of mucus and were pea-green. No significant abnormality was found in any of the other systems.

Bacteriology.—Cultures made from the throat and fæces on the fourth day of therapy produced a pure growth of coagulase-positive *Staph. aureus*. Post-mortem cultures from all levels of the intestinal tract and the lungs produced a pure growth of coagulase-positive *Staph. aureus*, which was resistant to penicillin, aureomycin, and oxytetracycline, and sensitive to chloramphenicol and streptomycin.

Case 2.—A boy, aged 2 years, was admitted with a clinical diagnosis of dysentery; there was a week's history of greenish diarrhœa with mucus but no blood. He had been vomiting intermittently. His sister was known to have Sonne dysentery. Physically there was no abnormality of note. His stool cultures showed no intestinal pathogens. He had two loose stools a day until the early hours of the fifth day of treatment with oxytetracycline, when he suddenly developed profuse vomiting and diarrhœa. He had nine loose stools before 8 A.M. Signs of peripheral circulatory failure became evident, and intravenous fluids were given immediately. His watery stools continued throughout the day, but his condition deteriorated and he developed a pyrexia of 104·2°F. He died at 4 A.M. on the sixth day, just twenty-six hours after the acute onset of symptoms.

Necropsy findings.—Numerous small mucosal hæmorrhages were present in the stomach. The Peyer's patches of the ileum were swollen, many being congested. The intervening mucosa showed no abnormality. The large bowel showed nothing of note. No significant abnormality was found in any of the other systems.

Bacteriology.—No pathogens were isolated ante-mortem from rectal swabs. Post-mortem cultures from bowel showed no dysenteric, salmonella, or coliform organisms. No attempt was made to isolate *Staph. aureus* because we did not suspect this organism at that time.

Although *Staph. aureus* was not isolated from this case, we think that the similarity between this case and case 1 is such that the ætiology was probably the same in both cases.

Group II: Sore Throat

(1) *With rash.*—7 patients developed a scarlatiniform rash with throat lesions on the fourth or the fifth day of treatment with oxytetracycline, and 5 of them had severe diarrhœa simultaneously. In 6 cases a pure growth of coagulase-positive *Staph. aureus* was obtained from throat swabs (table II). The following are illustrative examples:

Case 5.—A girl, aged 2 years, was admitted with a *Salmonella enteritidis* infection of the gastro-intestinal tract. On her fourth day of treatment she developed a pyrexia of 100·6°F, her fauces being much injected. A day later her fauces were œdematous, with areas of white ulceration. She had severe diarrhœa. Oxytetracycline was discontinued. Next day her fauces and buccal mucosa were much injected, with a white glazy film over them; the ulceration of the fauces persisted, and punctate erythema appeared. The child's persistent diarrhœa had produced dehydration, which was aggravated by her inability to swallow, because of her sore throat. She was treated with intravenous fluids, intravenous sulphadiazine 1 g. four-hourly, and intramuscular antistreptococcal serum 10,000 units. The day after treatment was started the rash was fading, but the white film on the fauces and buccal mucosa had extended on to the palate. Next day the rash disappeared; but there was extensive white ulceration of the palate and fauces, although the initial fiery redness of the surrounding mucosa was subsiding. The temperature came down to normal and remained so. (The pyrexia had persisted for five days, lasting two days after the start of sulphadiazine therapy.) The diarrhœa also lessened. Since the child had been rehydrated and could swallow fluids, the intravenous therapy was terminated after four days. The white ulcerated oropharyngeal lesions steadily improved till healing was complete on the seventeenth day after the start of treatment, leaving evidence of uvular scarring.

Bacteriology.—Throat swabs on the fourth day after the start of treatment produced a pure growth of coagulase-positive hæmolytic *Staph. aureus* resistant to penicillin, aureomycin, and oxytetracycline, and sensitive to chloramphenicol and streptomycin. Cultures made from the throat, sputum, and a sore on the tongue produced a pure growth of this organism for eight days after the initial pyrexia. *Staph. aureus* was not isolated from the fæces. Attempts to find candida in the oropharynx and fæces were unsuccessful.

TABLE II—STAPHYLOCOCCAL SCARLET-FEVER SYNDROME

Case no.	Age (yr.)	Sex	Disease	Side-effects	Day of appearance	Bacteriology
3	1¼/12	F	Sonne dysentery	T.102°F, ulcerated throat, scarlatiniform rash, diarrhœa	5	T.C., pure growth of *Staph. aureus*
4	3	F	,, ,,	T.102°F, inflamed throat, scarlatiniform rash	5	T.C., pure growth of *Staph. aureus*
5	2	F	Infection with *Salmonella enteritidis*	See text	4	T.C., pure growth of *Staph. aureus*
6	3	F	Infection with *Salmonella enteritidis*	T.100·4°F, inflamed throat, scarlatiniform rash, diarrhœa	4	T.C., pure growth of *Staph. aureus*
7	3½	F	Sonne dysentery	See text	4	T.C., pure growth of *Staph. aureus*
8	7/12	F	,, ,,	T.100·4°F, inflamed throat, scarlatiniform rash	4	No culture made
9*	16	F	Gangrenous appendicitis	T.103°F, ulcerated throat, scarlatiniform rash	4	T.C., pure growth of *Staph. aureus*
18	5	M	Clinical dysentery	T.100°F, balanitis, scarlatiniform rash	7	Culture from balanitis, pure growth of *Staph. aureus*

T.C., throat culture.

* Case 9 had 250 mg. of oxytetracycline six-hourly for forty-eight hours followed by 'Distaquaine' penicillin 600,000 units twice daily and streptomycin 0·5 g. twice daily.

TABLE III—OTHER SYNDROMES ASSOCIATED WITH COAGULASE-POSITIVE *Staph. aureus*

Case no.	Age (yr.)	Sex	Disease	Side-effects	Day of appearance	Bacteriology
1	6	F	Infection with *Salmonella typhimurium*	Ulcerated throat and gastro-enteritis	4	See text
10	5	F	Sonne dysentery	T.100·2°F, inflamed throat	4	T.C., *Staph. aureus*
11	5	M	" "	Vomiting and diarrhœa, T.100·2°F, inflamed throat	5	T.C., *Staph. aureus*
12	3	F	Infection with *Salmonella typhimurium*	T.102°F, inflamed throat with white exudate	4	T.C., pure growth of *Staph. aureus*
19	2	M	Sonne dysentery	Urinary infection	8	U.C., pure growth of *Staph. aureus*
20	52	F	Infection with *Salmonella typhimurium*	Urinary infection	3	U.C., pure growth of *Staph. aureus*
21	9/12	M	Gastro-enteritis	Urinary infection	5	U.C., pure growth of *Staph. aureus*
2	2	M	Clinical dysentery	Gastro-enteritis	5	No organism isolated
13	2	M	Sonne dysentery	T.100°F, inflamed fauces	4	Not examined
14	1 9/12	M	" "	T.100°F, inflamed throat	4	Not examined
15	12	F	" "	Inflamed throat	4	Not examined
16	2 1/2	F	Flexner dysentery	T.100°F, inflamed throat, vomiting, and diarrhœa	4	Not examined
17	5	F	Sonne dysentery	Injection of buccal mucosa and inflammation of throat	8	Not examined

T.C., throat culture. U.C., urine culture.

Case 6.—A girl, aged 3 years, sister of case 5, presented a similar clinical picture with similar bacteriological findings.

Case 7.—A girl, aged 3 1/2 years, was admitted with Sonne dysentery. On the fourth day of oxytetracycline therapy she developed pyrexia (99°F), with vomiting and diarrhœa. A macular erythema appeared which became a generalised punctate erythema. Intense petechial congestion of the pharynx and rhagades of the lips were present. The oxytetracycline was discontinued. Next day the rash was not so intense. The child had occasional bouts of vomiting but was not dehydrated. The pharyngeal congestion had extended forwards on to the palate and buccal mucosa. The following day the oropharyngeal congestion persisted, and there were white glazy patches of exudate on the anterior pillar of the fauces and on the palate. The vomiting and diarrhœa ceased. More exudate developed in the pharynx in the next twenty-four hours when the last remnants of the rash were seen. The throat exudate persisted for nine more days before clearing. During this time the lips became ulcerated, especially at the angles of the mouth.

Bacteriology.—Throat culture on the first day of the throat infection produced a profuse pure growth of hæmolytic coagulase-positive *Staph. aureus* resistant to penicillin, aureomycin, and oxytetracycline, and sensitive to chloramphenicol and streptomycin. A pure growth was obtainable from the throat for five days, and the staphylococcus was the predominant organism in the throat for seventeen days. *Staph. aureus* was not cultured from the fæces. A search for candida in throat and fæces was unsuccessful. A skin test for sensitivity to oxytetracycline was negative.

The following was a presumptive case :

Case 8 developed pyrexia, injected throat, and generalised punctate erythema on the fourth day of treatment. No bacteriological exmination was made in this patient, but the clinical features and time of onset indicate that the ætiology was probably the same as in the cases already mentioned.

(2) *Without rash.*—A febrile disturbance with infection of the oropharynx developed in 8 patients on the fourth or the fifth day of treatment (apart from case 17), and in 3 of them a coagulase-positive *Staph. aureus* was isolated as a pure growth on throat culture (table III).

Case 10.—A girl, aged 5 years, with Sonne dysentery developed pyrexia (100·2°F) and had enlarged and inflamed tonsils and uvula on the fourth day of treatment.

Bacteriology.—Throat culture produced a pure growth of *Staph. aureus* sensitive to chloramphenicol and resistant to penicillin, aureomycin, oxytetracycline, and streptomycin.

This patient had another course of oxytetracycline later with no untoward effect, the staphylococcus having been eliminated.

Case 11.—A boy, aged 5 years, with Sonne dysentery developed pyrexia (100·2°F), vomiting, and diarrhœa on the fifth day of treatment. His pharynx and tonsils were red. His pyrexia settled in twenty-four hours, but his throat did not clear for four days.

Bacteriology.—Throat culture produced a pure growth of coagulase-positive *Staph. aureus* resistant to penicillin, aureomycin, oxytetracycline, and chloramphenicol, and sensitive to streptomycin.

Case 12.—A girl, aged 3 years, sister of case 1, developed pyrexia (102°F) on the fourth day of treatment with oxytetracycline. She had neither vomiting nor diarrhœa, but she had an intensely inflamed throat, with white glazy patches of exudate. The pyrexia settled in forty-eight hours, and the throat cleared in four days.

Bacteriology.—Throat culture produced a pure growth of coagulase-positive *Staph. aureus* resistant to penicillin, aureomycin, and oxytetracycline, and sensitive to chloramphenicol and streptomycin.

The 5 patients in whom no bacteriological examination was made are presumed to have had a similar infection to that in the 3 described because they had a remarkably similar time of onset, and clinically they presented an indistinguishable picture.

Group III : No Throat Lesion

(1) *With rash.*—Case 18 presented as a scarlatiniform syndrome of extrafaucial or "surgical" scarlet-fever type, his infective lesion being a balanitis from which a pure growth of coagulase-positive *Staph. aureus* resistant to oxytetracycline was isolated.

(2) *Without rash.*—3 patients developed urinary infections due to a coagulase-positive *Staph. aureus* resistant to oxytetracycline. One of them (case 21) required a further course of oxytetracycline after the urinary infection was treated, and had no upset during this second course (table III).

SYNDROMES NOT ASSOCIATED WITH COAGULASE-POSITIVE *Staph. aureus*

Group IV : Pyrexia

24 patients developed pyrexia (at least 99°F) without other signs or symptoms during treatment with oxytetracycline. The remarkable feature about these cases was the similarity of the time of onset : they all occurred from the third to the sixth day (20 of them on either the fourth or the fifth day) after the start of oxytetracycline therapy (table IV). The coincidence of the time of onset of pyrexia with time of onset of the staphylococcal lesions reported above suggests a similar ætiology. No definite clinical sign apart from pyrexia was observed in these patients, and no bacteriological examinations

TABLE IV—PATIENTS WITH PYREXIA BUT NO OBSERVABLE LESION

Case no.	Age (yr.)	Sex	Type of dysentery	Pyrexia (°F)	Days of appearance
22	4/12	F	Sonne	99·2	3–5
23	3/12	F	Flexner	99·4	4
24	2	F	Sonne	99·6	5–7
25	3	M	Clinical	99·0	5
26	44	F	Flexner	99·0	6
27	4	F	Sonne	99·2	4
28	2½	M	Clinical	99·8	4–5
29	5	M	Sonne	99·8	4–5
30	1	M	Sonne	99·0	5
31	2	F	Sonne	100·0	4–5
32	4	M	Sonne	99·0	4–5
33	6	F	Sonne	99·0	5
34	2	F	Sonne	101·0	3–4
35	1 8/12	M	Sonne	99·0	4–6
36	17	F	Sonne	99·2	6
37	2 8/12	F	Sonne	99·2	5
38	1 10/12	F	Sonne	100·0	3–4
39	3/12	M	Sonne	99·0	4–6
40	9	F	Sonne	99·4	6
41	3	M	Sonne	99·0	6–8
42	5	F	Sonne	99·0	5
43	1	M	Sonne	100·2	4
44	5	M	Sonne	99·0	4–5
45	4	M	Flexner	99·0	5

were made; so we cannot attribute the pyrexia to any known cause. The investigation of these cases was mainly retrospective, which fact explains the lack of bacteriological examinations made to find an ætiological agent. The time of onset of the pyrexia was earlier than would be expected if the pyrexia was due to drug allergy. A similar number of cases of gastro-intestinal infections treated with other drugs were surveyed, but no evidence of pyrexia on the fourth or the fifth day was found.

Group V: Urticaria

3 patients (table v) developed urticarial lesions in association with oxytetracycline therapy. One of them (case 15) had had a throat infection on the fourth day of treatment. Another (case 47) exhibited the appearances of serum-sickness, with massive urticaria, circumoral and circumorbital œdema, and pains in his joints.

Group VI: Transient Erythema

A transient erythema was seen in 4 patients (table v); it came on from the eighth to the tenth day after the start of oxytetracycline therapy. In 3 of these cases throat cultures were made, but no organisms were isolated.

Discussion

In this series of 603 patients side-effects other than mild gastro-intestinal upsets developed in 51 patients on 52 occasions. This represents an incidence of about 8%.

The scarlet-fever syndrome observed in 8 cases is of interest because *Staph. aureus* was the only organism isolated in 7 of them. Staphylococcal scarlet fever is not unknown and has been described by several workers. Aranow and Wood (1942) reviewed the published reports on staphylococcal scarlet fever and made reference to the isolation of the erythrogenic toxin. We have found 6 published cases of this syndrome complicating antibiotic therapy.

Finland (1951) cites Chang and Jackson as having noted it in 3 patients under treatment for either pertussis or diphtheria with some of the newer antibiotics (unspecified), and stating that the rapid disappearance of *Hæmophilus pertussis* and *Corynebacterium diphtheriæ* from nasopharyngeal cultures was promptly followed by the development of typical scarlet fever, pharyngeal swabs showing pure cultures of hæmolytic *Staph. aureus* and no hæmolytic streptococci. Finland mentions another case of staphylococcal scarlet fever in a patient receiving prophylactic penicillin for an extensive burn, the organism being cultured from the throat and the surface burn.

Hazen et al. (1951) record 2 cases. In one a scarlatiniform rash developed on the third day of therapy with oxytetracycline, and proceeded to ulcerative stomatitis, pharyngitis, diarrhœa and vomiting. This case corresponds closely to those we report here. The second case is stated to have developed the same signs and symptoms on the ninth day of aureomycin therapy.

The syndrome appears to consist of fever, throat lesions (sometimes very severe), scarlatiniform rash, and (in 5 of our cases) concomitant vomiting and diarrhœa. However, we think this infection is analogous to the modern concept of hæmolytic streptococcal scarlet fever, in which may be found infectious sore-throat syndromes, and the erythema only appears if the patient is sensitive to the erythrogenic toxins. Case 18 appears to be an example of extrafaucial or "surgical" scarlatina with the balanitis as the site of infection. This case occurred on the seventh day after the start of oxytetracycline therapy; but, as several of our cases show, *Staph. aureus* may persist in a pure culture from an infected site for several days after the cessation of treatment.

Seven of the throat infections (cases 1, 3, 5, 6, 7, 9, and 12) had intense congestion of the fauces and buccal mucosa and white glazy patches of exudate, which resembled moniliasis. In view of published reports suggesting that moniliasis might complicate the use of broad-spectrum antibiotics (Harris 1950, Woods et al. 1951, Tomaszewski 1951, and others), attempts were made to find candida in the mouth, throat, and rectum by culture on Sabouraud's medium but without success. In these cases a pure growth of *Staph. aureus* alone was obtained from the oropharynx.

Vomiting and diarrhœa were additional signs in 6 cases to other symptom complexes, but in 2 cases vomiting and diarrhœa on the fourth and the fifth days after the start of oxytetracycline therapy led to the death of the children within a very short period from the onset of these signs, in spite of intravenous fluids and anti-shock treatment. In only 1 of them (case 1) did we isolate *Staph. aureus* from the bowel.

Reports from many workers indicate that staphylococcal gastro-enterocolitis is a serious complicating factor in antibiotic therapy, particularly during therapy with oxytetracycline (Jackson et al. 1951, Janbon et al. 1952, Terplan et al. 1953, Dearing and Heilman 1953, Fairlie and Kendall 1953, Gardner 1953). These cases occur both with and without the finding of a *Staph. aureus*; and pathologically some are described as having pseudo-membranous ileocolitis, whereas others show no disturbance of the mucosa. Little abnormality was noted in the mucosa of case 2, but case 1 showed patchy areas of early inflammation throughout the gastro-intestinal mucosa and watery pea-green stools. Many workers suggest that the sudden onset, dramatic progress, and clinical features of this gastro-enterocolitis resemble

TABLE V—SYNDROMES NOT ASSOCIATED WITH RESISTANT *Staph. aureus*

Case no.	Age (yr.)	Sex	Disease	Side-effects	Day of appearance	Bacteriology
15	12	F	Sonne dysentery	Urticaria	10	..
46	4	F	Sonne dysentery	Urticaria	7	..
47	43	M	Pneumonia	Urticaria, angi-œdema, joint pains	4	..
48	8	F	Sonne dysentery	Transient erythema	8	T.C., no growth
49	5	F	Sonne dysentery	Transient erythema	8	..
50	4	F	Sonne dysentery	Transient erythema	9	T.C., no growth
51	2½	M	Sonne dysentery	Transient erythema	10	T.C., no growth

T.C., throat culture.

Asiatic cholera, and Janbon et al. (1952) call this syndrome *le syndrome cholériforme de la terramycine.*

The pathogenesis of these conditions is not yet clear. At present most workers consider that the resistant staphylococci become pathogenic when the other organisms are suppressed by broad-spectrum antibiotics or by the combination of penicillin and streptomycin. The view has been advanced that these drugs might actually stimulate the organisms to pathogenicity or to the production of toxins (Fairlie and Kendall 1953, Prissick 1953). Fairlie and Kendall support this view because some of their patients exhibited symptoms as early as twenty-four hours after antibiotics were first given. However, in our cases, where a resistant staphylococcus was involved, the onset was usually on the fourth or fifth day after the start of antibiotic therapy. Since Linsell and Fletcher (1950) and Di Caprio and Rantz (1950) found that the normal flora present before therapy was either eliminated or much reduced shortly after the start of therapy (Linsell and Fletcher stated that coliform bacilli and fæcal streptococci were entirely eliminated in all of their cases by the third day), we are of the opinion that the staphylococci isolated in our cases became pathogenic after the normal flora had been suppressed. The gastro-intestinal upsets observed suggest that the staphylococci might secrete an enterotoxin similar to, or the same as, that observed in food-poisoning due to staphylococcal enterotoxin. This well-known syndrome is clinically similar to the staphylococcal gastro-enterocolitis we describe.

Hofer and McCaskey (1954) summarised the many mechanisms which may play a part in an antibiotic-resistant "superinfection" into three groups: (1) environmental factors (e.g., where suppression of sensitive organisms upsets possible symbiotic states); (2) stimulation of bacterial growth by antibiotics; and (3) tissue alterations. Under this last heading they point out that aureomycin, oxytetracycline, and chloramphenicol may cause clinical vitamin deficiency. They suggest that the alteration of the bowel flora resulting in vitamin-B deficiency may also favour acute enterocolitis as a result of local tissue alteration and, perhaps, decreased body resistance.

3 of our patients developed urinary infections due to resistant staphylococci; these cleared up on therapy with antibiotics to which the staphylococci were sensitive. The predominance of this organism in the urine after the use of oxytetracycline has been noted by other workers (Finland et al. 1950, Jackson et al. 1951, Womack et al. 1952).

It will be observed that the 5 cases in which phage-typing was done indicate that three different organisms were involved. Indeed, cases 1 and 12, sisters who were admitted together and who developed side-effects on the same day, acquired their "superinfections" from two different phage-pattern strains.

We suggest that the organism was probably harboured by the patients on admission, because these cases occurred in different wards, at different times, and with different nurses. On two occasions 2 sisters have been admitted to hospital and have developed syndromes due to oxytetracycline-resistant staphylococci with the same chronological sequence of events (cases 5 and 6; and cases 1 and 12). In addition, the resistant organism was not isolated from the upper respiratory tract of the nurses and doctors in contact with the latter 2 sisters.

Dearing and Heilman (1953) treated gastro-enterocolitis due to resistant staphylococci by discontinuing the oxytetracycline and giving erythromycin, obtaining good clinical results and the elimination of the staphylococci from the bowel. However, they cite the finding of a strain of *Staph. aureus* resistant to erythromycin in a patient in whom this drug was used, and forecast that more resistant strains will develop. So it appears that disturbances of the host-parasite-drug relationship are not going to be overcome by finding new antibiotics.

TABLE VI—RESISTANCE TO ANTIBIOTICS OF STAPHYLOCOCCI ISOLATED

Case no.	Resistant to	Sensitive to	Phage-type
1	P, A, O	C, S	7/54/77
5	P, A, O	C, S	..
6	P, A, O	C, S	..
7	P, A, O	C, S	75/77
9	P, A, O, S	C	75/77
10	P, A, O, S	C	..
11	P, A, O, C	S	75/77
12	P, A, O	C, S	6/47/53/75+
18	P, A, O	C, S	..
19	P, A, O, C	S	..
20	P, A, O	C, S	..
21	P, A, O	C, S	..

A, aureomycin. C, chloramphenicol. O, oxytetracycline. P, penicillin. S, streptomycin.

Finland et al. (1954) raise a doubt about the value of erythromycin in staphylococcal diarrhœa, stating that in most of these cases the stopping of treatment with the offending antibiotic leads to fairly prompt cessation of diarrhœa, and the staphylococci clear readily from the stools, even when staphylococci are still being obtained from cultures of other infected materials. We cannot comment on the rate of clearance of this organism from the bowel; but, as cases 5 and 7 showed, *Staph. aureus* persisted for a considerable time (eight and five days respectively) as a pure growth on throat culture. In view of this we think it is probably advantageous to the patient to be given an antibiotic to which the organism is sensitive. The clinical management of the diarrhœa caused by resistant organisms is stated by Hofer and McCaskey (1954) to be extraordinarily difficult. However, Finland et al. (1954) have shown that the incidence of watery diarrhœa associated with the administration of oxytetracycline or of aureomycin can be materially reduced, although not entirely prevented, by decreasing the dosage of these antibiotics. They also draw attention to the precipitating effect of the administration of cathartics in producing this diarrhœa, and state that cathartics should be avoided.

We wish to point out that 2 of our patients developed syndromes due to a resistant staphylococcus, but on the elimination of this organism they had a second course of oxytetracycline with no ill effects (cases 10 and 21).

Dearing and Heilman (1953) state that in their locality it was only after several years' use of oxytetracycline and aureomycin that resistant strains of *Staph. aureus* were produced, but the resistant strains we have observed were found in the first fourteen months (from October, 1952, to December, 1953) of the use of oxytetracycline.

The resistance and sensitivity of the staphylococci to different antibiotics are shown in table VI. Of fourteen staphylococci isolated twelve were cultured to assess their resistance to antibiotics: they were all resistant to penicillin, aureomycin, and oxytetracycline; two were resistant to streptomycin in addition; and a further two were resistant to chloramphenicol in addition.

3 urticarial reactions were noted: one on the fourth day, one on the seventh, and one on the tenth. Case 47 had severe angiœdema of face and eyes as well as an urticarial reaction. Johnston and Cazort (1953) report a case similar to this but with severe cyanosis of extremities, lips, and face; it developed on the eighth day of therapy, and the patient had had a previous course of oxytetracycline.

Transient erythema was observed in 4 cases, sometimes with mild pyrexia but with no throat lesions. The rash cleared in all cases within twenty-four hours, and usually there was no general upset. Throat cultures in 3 of these patients were negative. These signs were

TABLE I—CLINICAL SYNDROMES DEVELOPING DURING OXYTETRACYCLINE THERAPY

Group	No. of cases	*Staph. aureus*	
		Isolated	Not isolated
I: fulminating gastro-enterocolitis ..	2	1	1
II: sore throat			
With rash—i.e., staphylococcal scarlet-fever syndrome	7	6	1
Without rash	8	3	5
III: no throat lesion			
With rash—i.e., "surgical" or extrafaucial staphylococcal scarlet-fever syndrome	1	1	0
Without rash	3	3	0
Totals of groups I–III	21	14	7
Group IV: pyrexia as sole clinical feature	24	0	24
Group V: urticaria	3	0	3
Group VI: transient erythema ..	4	0	4
Totals of groups IV–VI	31	0	31

a pyrexia of 99°F, with a little vomiting and green diarrhœa. On examination she had inflamed fauces, with white patches of exudate. Oxytetracycline was discontinued. That day the pyrexia increased to 102°F. The child had twelve loose stools in twenty-four hours, but she developed intense peripheral circulatory failure next morning and died twenty-four hours after onset of diarrhœa.

Necropsy findings.—Patchy areas of early inflammation were seen in the stomach, duodenum, jejunum, ileum, cæcum, ascending colon, and descending colon. The appearances did not indicate gross damage. The stools contained a considerable amount of mucus and were pea-green. No significant abnormality was found in any of the other systems.

Bacteriology.—Cultures made from the throat and fæces on the fourth day of therapy produced a pure growth of coagulase-positive *Staph. aureus*. Post-mortem cultures from all levels of the intestinal tract and the lungs produced a pure growth of coagulase-positive *Staph. aureus*, which was resistant to penicillin, aureomycin, and oxytetracycline, and sensitive to chloramphenicol and streptomycin.

Case 2.—A boy, aged 2 years, was admitted with a clinical diagnosis of dysentery; there was a week's history of greenish diarrhœa with mucus but no blood. He had been vomiting intermittently. His sister was known to have Sonne dysentery. Physically there was no abnormality of note. His stool cultures showed no intestinal pathogens. He had two loose stools a day until the early hours of the fifth day of treatment with oxytetracycline, when he suddenly developed profuse vomiting and diarrhœa. He had nine loose stools before 8 A.M. Signs of peripheral circulatory failure became evident, and intravenous fluids were given immediately. His watery stools continued throughout the day, but his condition deteriorated and he developed a pyrexia of 104·2°F. He died at 4 A.M. on the sixth day, just twenty-six hours after the acute onset of symptoms.

Necropsy findings.—Numerous small mucosal hæmorrhages were present in the stomach. The Peyer's patches of the ileum were swollen, many being congested. The intervening mucosa showed no abnormality. The large bowel showed nothing of note. No significant abnormality was found in any of the other systems.

Bacteriology.—No pathogens were isolated ante-mortem from rectal swabs. Post-mortem cultures from bowel showed no dysenteric, salmonella, or coliform organisms. No attempt was made to isolate *Staph. aureus* because we did not suspect this organism at that time.

Although *Staph. aureus* was not isolated from this case, we think that the similarity between this case and case 1 is such that the ætiology was probably the same in both cases.

Group II: Sore Throat

(1) *With rash.*—7 patients developed a scarlatiniform rash with throat lesions on the fourth or the fifth day of treatment with oxytetracycline, and 5 of them had severe diarrhœa simultaneously. In 6 cases a pure growth of coagulase-positive *Staph. aureus* was obtained from throat swabs (table II). The following are illustrative examples:

Case 5.—A girl, aged 2 years, was admitted with a *Salmonella enteritidis* infection of the gastro-intestinal tract. On her fourth day of treatment she developed a pyrexia of 100·6°F, her fauces being much injected. A day later her fauces were œdematous, with areas of white ulceration. She had severe diarrhœa. Oxytetracycline was discontinued. Next day her fauces and buccal mucosa were much injected, with a white glazy film over them; the ulceration of the fauces persisted, and punctate erythema appeared. The child's persistent diarrhœa had produced dehydration, which was aggravated by her inability to swallow, because of her sore throat. She was treated with intravenous fluids, intravenous sulphadiazine 1 g. four-hourly, and intramuscular antistreptococcal serum 10,000 units. The day after treatment was started the rash was fading, but the white film on the fauces and buccal mucosa had extended on to the palate. Next day the rash disappeared; but there was extensive white ulceration of the palate and fauces, although the initial fiery redness of the surrounding mucosa was subsiding. The temperature came down to normal and remained so. (The pyrexia had persisted for five days, lasting two days after the start of sulphadiazine therapy.) The diarrhœa also lessened. Since the child had been rehydrated and could swallow fluids, the intravenous therapy was terminated after four days. The white ulcerated oropharyngeal lesions steadily improved till healing was complete on the seventeenth day after the start of treatment, leaving evidence of uvular scarring.

Bacteriology.—Throat swabs on the fourth day after the start of treatment produced a pure growth of coagulase-positive hæmolytic *Staph. aureus* resistant to penicillin, aureomycin, and oxytetracycline, and sensitive to chloramphenicol and streptomycin. Cultures made from the throat, sputum, and a sore on the tongue produced a pure growth of this organism for eight days after the initial pyrexia. *Staph. aureus* was not isolated from the fæces. Attempts to find candida in the oropharynx and fæces were unsuccessful.

TABLE II—STAPHYLOCOCCAL SCARLET-FEVER SYNDROME

Case no.	Age (yr.)	Sex	Disease	Side-effects	Day of appearance	Bacteriology
3	1 4/12	F	Sonne dysentery	T.102°F, ulcerated throat, scarlatiniform rash, diarrhœa	5	T.C., pure growth of *Staph. aureus*
4	3	F	,, ,,	T.102°F, inflamed throat, scarlatiniform rash	5	T.C., pure growth of *Staph. aureus*
5	2	F	Infection with *Salmonella enteritidis*	See text	4	T.C., pure growth of *Staph. aureus*
6	3	F	Infection with *Salmonella enteritidis*	T.100·4°F, inflamed throat, scarlatiniform rash, diarrhœa	4	T.C., pure growth of *Staph. aureus*
7	3 1/2	F	Sonne dysentery	See text	4	T.C., pure growth of *Staph. aureus*
8	7/12	F	,, ,,	T.100·4°F, inflamed throat, scarlatiniform rash	4	No culture made
9*	16	F	Gangrenous appendicitis	T.103°F, ulcerated throat, scarlatiniform rash	4	T.C., pure growth of *Staph. aureus*
18	5	M	Clinical dysentery	T.100°F, balanitis, scarlatiniform rash	7	Culture from balanitis, pure growth of *Staph. aureus*

T.C., throat culture.

* Case 9 had 250 mg. of oxytetracycline six-hourly for forty-eight hours followed by 'Distaquaine' penicillin 600,000 units twice daily and streptomycin 0·5 g. twice daily.

TABLE III—OTHER SYNDROMES ASSOCIATED WITH COAGULASE-POSITIVE *Staph. aureus*

Case no.	Age (yr.)	Sex	Disease	Side-effects	Day of appearance	Bacteriology
1	6	F	Infection with *Salmonella typhimurium*	Ulcerated throat and gastro-enteritis	4	See text
10	5	F	Sonne dysentery	T.100·2°F, inflamed throat	4	T.C., *Staph. aureus*
11	5	M	,, ,,	Vomiting and diarrhœa, T.100·2°F, inflamed throat	5	T.C., *Staph. aureus*
12	3	F	Infection with *Salmonella typhimurium*	T.102°F, inflamed throat with white exudate	4	T.C., pure growth of *Staph. aureus*
19	2	M	Sonne dysentery	Urinary infection	8	U.C., pure growth of *Staph. aureus*
20	52	F	Infection with *Salmonella typhimurium*	Urinary infection	3	U.C., pure growth of *Staph. aureus*
21	6/12	M	Gastro-enteritis	Urinary infection	5	U.C., pure growth of *Staph. aureus*
2	2	M	Clinical dysentery	Gastro-enteritis	5	No organism isolated
13	2	M	Sonne dysentery	T.100°F, inflamed fauces	4	Not examined
14	1 4/12	M	,, ,,	T.100°F, inflamed throat	4	Not examined
15	12	F	,, ,,	Inflamed throat	4	Not examined
16	2 1/2	F	Flexner dysentery	T.100°F, inflamed throat, vomiting, and diarrhœa	4	Not examined
17	5	F	Sonne dysentery	Injection of buccal mucosa and inflammation of throat	8	Not examined

T.C., throat culture. U.C., urine culture.

Case 6.—A girl, aged 3 years, sister of case 5, presented a similar clinical picture with similar bacteriological findings.

Case 7.—A girl, aged 3 1/2 years, was admitted with Sonne dysentery. On the fourth day of oxytetracycline therapy she developed pyrexia (99°F), with vomiting and diarrhœa. A macular erythema appeared which became a generalised punctate erythema. Intense petechial congestion of the pharynx and rhagades of the lips were present. The oxytetracycline was discontinued. Next day the rash was not so intense. The child had occasional bouts of vomiting but was not dehydrated. The pharyngeal congestion had extended forwards on to the palate and buccal mucosa. The following day the oropharyngeal congestion persisted, and there were white glazy patches of exudate on the anterior pillar of the fauces and on the palate. The vomiting and diarrhœa ceased. More exudate developed in the pharynx in the next twenty-four hours when the last remnants of the rash were seen. The throat exudate persisted for nine more days before clearing. During this time the lips became ulcerated, especially at the angles of the mouth.

Bacteriology.—Throat culture on the first day of the throat infection produced a profuse pure growth of hæmolytic coagulase-positive *Staph. aureus* resistant to penicillin, aureomycin, and oxytetracycline, and sensitive to chloramphenicol and streptomycin. A pure growth was obtainable from the throat for five days, and the staphylococcus was the predominant organism in the throat for seventeen days. *Staph. aureus* was not cultured from the fæces. A search for candida in throat and fæces was unsuccessful. A skin test for sensitivity to oxytetracycline was negative.

The following was a presumptive case:

Case 8 developed pyrexia, injected throat, and generalised punctate erythema on the fourth day of treatment. No bacteriological exmination was made in this patient, but the clinical features and time of onset indicate that the ætiology was probably the same as in the cases already mentioned.

(2) *Without rash.*—A febrile disturbance with infection of the oropharynx developed in 8 patients on the fourth or the fifth day of treatment (apart from case 17), and in 3 of them a coagulase-positive *Staph. aureus* was isolated as a pure growth on throat culture (table III).

Case 10.—A girl, aged 5 years, with Sonne dysentery developed pyrexia (100·2°F) and had enlarged and inflamed tonsils and uvula on the fourth day of treatment.

Bacteriology.—Throat culture produced a pure growth of *Staph. aureus* sensitive to chloramphenicol and resistant to penicillin, aureomycin, oxytetracycline, and streptomycin.

This patient had another course of oxytetracycline later with no untoward effect, the staphylococcus having been eliminated.

Case 11.—A boy, aged 5 years, with Sonne dysentery developed pyrexia (100·2°F), vomiting, and diarrhœa on the fifth day of treatment. His pharynx and tonsils were red. His pyrexia settled in twenty-four hours, but his throat did not clear for four days.

Bacteriology.—Throat culture produced a pure growth of coagulase-positive *Staph. aureus* resistant to penicillin, aureomycin, oxytetracycline, and chloramphenicol, and sensitive to streptomycin.

Case 12.—A girl, aged 3 years, sister of case 1, developed pyrexia (102°F) on the fourth day of treatment with oxytetracycline. She had neither vomiting nor diarrhœa, but she had an intensely inflamed throat, with white glazy patches of exudate. The pyrexia settled in forty-eight hours, and the throat cleared in four days.

Bacteriology.—Throat culture produced a pure growth of coagulase-positive *Staph. aureus* resistant to penicillin, aureomycin, and oxytetracycline, and sensitive to chloramphenicol and streptomycin.

The 5 patients in whom no bacteriological examination was made are presumed to have had a similar infection to that in the 3 described because they had a remarkably similar time of onset, and clinically they presented an indistinguishable picture.

Group III: No Throat Lesion

(1) *With rash.*—Case 18 presented as a scarlatiniform syndrome of extrafaucial or "surgical" scarlet-fever type, his infective lesion being a balanitis from which a pure growth of coagulase-positive *Staph. aureus* resistant to oxytetracycline was isolated.

(2) *Without rash.*—3 patients developed urinary infections due to a coagulase-positive *Staph. aureus* resistant to oxytetracycline. One of them (case 21) required a further course of oxytetracycline after the urinary infection was treated, and had no upset during this second course (table III).

SYNDROMES NOT ASSOCIATED WITH COAGULASE-POSITIVE *Staph. aureus*

Group IV: Pyrexia

24 patients developed pyrexia (at least 99°F) without other signs or symptoms during treatment with oxytetracycline. The remarkable feature about these cases was the similarity of the time of onset: they all occurred from the third to the sixth day (20 of them on either the fourth or the fifth day) after the start of oxytetracycline therapy (table IV). The coincidence of the time of onset of pyrexia with time of onset of the staphylococcal lesions reported above suggests a similar ætiology. No definite clinical sign apart from pyrexia was observed in these patients, and no bacteriological examinations

TABLE IV—PATIENTS WITH PYREXIA BUT NO OBSERVABLE LESION

Case no.	Age (yr.)	Sex	Type of dysentery	Pyrexia (°F)	Days of appearance
22	4/12	F	Sonne	99·2	3–5
23	8/12	F	Flexner	99·4	4
24	2	F	Sonne	99·6	5–7
25	3	M	Clinical	99·0	5
26	44	F	Flexner	99·0	6
27	4	F	Sonne	99·2	4
28	2½	M	Clinical	99·8	4–5
29	5	M	Sonne	99·8	4–5
30	1	M	Sonne	99·0	5
31	2	F	Sonne	100·0	4–5
32	4	M	Sonne	99·0	4–5
33	6	F	Sonne	99·0	5
34	2	F	Sonne	101·0	3–4
35	1 9/12	M	Sonne	99·0	4–6
36	17	F	Sonne	99·2	6
37	2 8/12	F	Sonne	99·2	5
38	1 10/12	F	Sonne	100·0	3–4
39	8/12	M	Sonne	99·0	4–6
40	9	F	Sonne	99·4	6
41	3	M	Sonne	99·0	6–8
42	5	F	Sonne	99·0	5
43	1	M	Sonne	100·2	4
44	5	M	Sonne	99·0	4–5
45	4	M	Flexner	99·0	5

were made; so we cannot attribute the pyrexia to any known cause. The investigation of these cases was mainly retrospective, which fact explains the lack of bacteriological examinations made to find an ætiological agent. The time of onset of the pyrexia was earlier than would be expected if the pyrexia was due to drug allergy. A similar number of cases of gastro-intestinal infections treated with other drugs were surveyed, but no evidence of pyrexia on the fourth or the fifth day was found.

Group V: Urticaria

3 patients (table v) developed urticarial lesions in association with oxytetracycline therapy. One of them (case 15) had had a throat infection on the fourth day of treatment. Another (case 47) exhibited the appearances of serum-sickness, with massive urticaria, circumoral and circumorbital œdema, and pains in his joints.

Group VI: Transient Erythema

A transient erythema was seen in 4 patients (table v); it came on from the eighth to the tenth day after the start of oxytetracycline therapy. In 3 of these cases throat cultures were made, but no organisms were isolated.

Discussion

In this series of 603 patients side-effects other than mild gastro-intestinal upsets developed in 51 patients on 52 occasions. This represents an incidence of about 8%.

The scarlet-fever syndrome observed in 8 cases is of interest because *Staph. aureus* was the only organism isolated in 7 of them. Staphylococcal scarlet fever is not unknown and has been described by several workers. Aranow and Wood (1942) reviewed the published reports on staphylococcal scarlet fever and made reference to the isolation of the erythrogenic toxin. We have found 6 published cases of this syndrome complicating antibiotic therapy.

Finland (1951) cites Chang and Jackson as having noted it in 3 patients under treatment for either pertussis or diphtheria with some of the newer antibiotics (unspecified), and stating that the rapid disappearance of *Hæmophilus pertussis* and *Corynebacterium diphtheriæ* from nasopharyngeal cultures was promptly followed by the development of typical scarlet fever, pharyngeal swabs showing pure cultures of hæmolytic *Staph. aureus* and no hæmolytic streptococci. Finland mentions another case of staphylococcal scarlet fever in a patient receiving prophylactic penicillin for an extensive burn, the organism being cultured from the throat and the surface burn.

Hazen et al. (1951) record 2 cases. In one a scarlatiniform rash developed on the third day of therapy with oxytetracycline, and proceeded to ulcerative stomatitis, pharyngitis, diarrhœa and vomiting. This case corresponds closely to those we report here. The second case is stated to have developed the same signs and symptoms on the ninth day of aureomycin therapy.

The syndrome appears to consist of fever, throat lesions (sometimes very severe), scarlatiniform rash, and (in 5 of our cases) concomitant vomiting and diarrhœa. However, we think this infection is analogous to the modern concept of hæmolytic streptococcal scarlet fever, in which may be found infectious sore-throat syndromes, and the erythema only appears if the patient is sensitive to the erythrogenic toxins. Case 18 appears to be an example of extrafaucial or "surgical" scarlatina with the balanitis as the site of infection. This case occurred on the seventh day after the start of oxytetracycline therapy; but, as several of our cases show, *Staph. aureus* may persist in a pure culture from an infected site for several days after the cessation of treatment.

Seven of the throat infections (cases 1, 3, 5, 6, 7, 9, and 12) had intense congestion of the fauces and buccal mucosa and white glazy patches of exudate, which resembled moniliasis. In view of published reports suggesting that moniliasis might complicate the use of broad-spectrum antibiotics (Harris 1950, Woods et al. 1951, Tomaszewski 1951, and others), attempts were made to find candida in the mouth, throat, and rectum by culture on Sabouraud's medium but without success. In these cases a pure growth of *Staph. aureus* alone was obtained from the oropharynx.

Vomiting and diarrhœa were additional signs in 6 cases to other symptom complexes, but in 2 cases vomiting and diarrhœa on the fourth and the fifth days after the start of oxytetracycline therapy led to the death of the children within a very short period from the onset of these signs, in spite of intravenous fluids and anti-shock treatment. In only 1 of them (case 1) did we isolate *Staph. aureus* from the bowel.

Reports from many workers indicate that staphylococcal gastro-enterocolitis is a serious complicating factor in antibiotic therapy, particularly during therapy with oxytetracycline (Jackson et al. 1951, Janbon et al. 1952, Terplan et al. 1953, Dearing and Heilman 1953, Fairlie and Kendall 1953, Gardner 1953). These cases occur both with and without the finding of a *Staph. aureus*; and pathologically some are described as having pseudo-membranous ileocolitis, whereas others show no disturbance of the mucosa. Little abnormality was noted in the mucosa of case 2, but case 1 showed patchy areas of early inflammation throughout the gastro-intestinal mucosa and watery pea-green stools. Many workers suggest that the sudden onset, dramatic progress, and clinical features of this gastro-enterocolitis resemble

TABLE V—SYNDROMES NOT ASSOCIATED WITH RESISTANT *Staph. aureus*

Case no.	Age (yr.)	Sex	Disease	Side-effects	Day of appearance	Bacteriology
15	12	F	Sonne dysentery	Urticaria	10	..
46	4	F	Sonne dysentery	Urticaria	7	..
47	43	M	Pneumonia	Urticaria, angi-œdema, joint pains	4	..
48	8	F	Sonne dysentery	Transient erythema	8	T.C., no growth
49	5	F	Sonne dysentery	Transient erythema	8	..
50	4	F	Sonne dysentery	Transient erythema	9	T.C., no growth
51	2½	M	Sonne dysentery	Transient erythema	10	T.C., no growth

T.C., throat culture.

Asiatic cholera, and Janbon et al. (1952) call this syndrome *le syndrome cholériforme de la terramycine*.

The pathogenesis of these conditions is not yet clear. At present most workers consider that the resistant staphylococci become pathogenic when the other organisms are suppressed by broad-spectrum antibiotics or by the combination of penicillin and streptomycin. The view has been advanced that these drugs might actually stimulate the organisms to pathogenicity or to the production of toxins (Fairlie and Kendall 1953, Prissick 1953). Fairlie and Kendall support this view because some of their patients exhibited symptoms as early as twenty-four hours after antibiotics were first given. However, in our cases, where a resistant staphylococcus was involved, the onset was usually on the fourth or fifth day after the start of antibiotic therapy. Since Linsell and Fletcher (1950) and Di Caprio and Rantz (1950) found that the normal flora present before therapy was either eliminated or much reduced shortly after the start of therapy (Linsell and Fletcher stated that coliform bacilli and fæcal streptococci were entirely eliminated in all of their cases by the third day), we are of the opinion that the staphylococci isolated in our cases became pathogenic after the normal flora had been suppressed. The gastro-intestinal upsets observed suggest that the staphylococci might secrete an enterotoxin similar to, or the same as, that observed in food-poisoning due to staphylococcal enterotoxin. This well-known syndrome is clinically similar to the staphylococcal gastro-enterocolitis we describe.

Hofer and McCaskey (1954) summarised the many mechanisms which may play a part in an antibiotic-resistant "superinfection" into three groups: (1) environmental factors (e.g., where suppression of sensitive organisms upsets possible symbiotic states); (2) stimulation of bacterial growth by antibiotics; and (3) tissue alterations. Under this last heading they point out that aureomycin, oxytetracycline, and chloramphenicol may cause clinical vitamin deficiency. They suggest that the alteration of the bowel flora resulting in vitamin-B deficiency may also favour acute enterocolitis as a result of local tissue alteration and, perhaps, decreased body resistance.

3 of our patients developed urinary infections due to resistant staphylococci; these cleared up on therapy with antibiotics to which the staphylococci were sensitive. The predominance of this organism in the urine after the use of oxytetracycline has been noted by other workers (Finland et al. 1950, Jackson et al. 1951, Womack et al. 1952).

It will be observed that the 5 cases in which phage-typing was done indicate that three different organisms were involved. Indeed, cases 1 and 12, sisters who were admitted together and who developed side-effects on the same day, acquired their "superinfections" from two different phage-pattern strains.

We suggest that the organism was probably harboured by the patients on admission, because these cases occurred in different wards, at different times, and with different nurses. On two occasions 2 sisters have been admitted to hospital and have developed syndromes due to oxytetracycline-resistant staphylococci with the same chronological sequence of events (cases 5 and 6; and cases 1 and 12). In addition, the resistant organism was not isolated from the upper respiratory tract of the nurses and doctors in contact with the latter 2 sisters.

Dearing and Heilman (1953) treated gastro-enterocolitis due to resistant staphylococci by discontinuing the oxytetracycline and giving erythromycin, obtaining good clinical results and the elimination of the staphylococci from the bowel. However, they cite the finding of a strain of *Staph. aureus* resistant to erythromycin in a patient in whom this drug was used, and forecast that more resistant strains will develop. So it appears that disturbances of the host-parasite-drug relationship are not going to be overcome by finding new antibiotics.

TABLE VI—RESISTANCE TO ANTIBIOTICS OF STAPHYLOCOCCI ISOLATED

Case no.	Resistant to	Sensitive to	Phage-type
1	P, A, O	C, S	7/54/77
5	P, A, O	C, S	..
6	P, A, O	C, S	..
7	P, A, O	C, S	75/77
9	P, A, O, S	C	75/77
10	P, A, O, S	C	..
11	P, A, O, C	S	75/77
12	P, A, O	C, S	6/47/53/75+
18	P, A, O	C, S	..
19	P, A, O, C	S	..
20	P, A, O	C, S	..
21	P, A, O	C, S	..

A, aureomycin. C, chloramphenicol. O, oxytetracycline. P, penicillin. S, streptomycin.

Finland et al. (1954) raise a doubt about the value of erythromycin in staphylococcal diarrhœa, stating that in most of these cases the stopping of treatment with the offending antibiotic leads to fairly prompt cessation of diarrhœa, and the staphylococci clear readily from the stools, even when staphylococci are still being obtained from cultures of other infected materials. We cannot comment on the rate of clearance of this organism from the bowel; but, as cases 5 and 7 showed, *Staph. aureus* persisted for a considerable time (eight and five days respectively) as a pure growth on throat culture. In view of this we think it is probably advantageous to the patient to be given an antibiotic to which the organism is sensitive. The clinical management of the diarrhœa caused by resistant organisms is stated by Hofer and McCaskey (1954) to be extraordinarily difficult. However, Finland et al. (1954) have shown that the incidence of watery diarrhœa associated with the administration of oxytetracycline or of aureomycin can be materially reduced, although not entirely prevented, by decreasing the dosage of these antibiotics. They also draw attention to the precipitating effect of the administration of cathartics in producing this diarrhœa, and state that cathartics should be avoided.

We wish to point out that 2 of our patients developed syndromes due to a resistant staphylococcus, but on the elimination of this organism they had a second course of oxytetracycline with no ill effects (cases 10 and 21).

Dearing and Heilman (1953) state that in their locality it was only after several years' use of oxytetracycline and aureomycin that resistant strains of *Staph. aureus* were produced, but the resistant strains we have observed were found in the first fourteen months (from October, 1952, to December, 1953) of the use of oxytetracycline.

The resistance and sensitivity of the staphylococci to different antibiotics are shown in table VI. Of fourteen staphylococci isolated twelve were cultured to assess their resistance to antibiotics: they were all resistant to penicillin, aureomycin, and oxytetracycline; two were resistant to streptomycin in addition; and a further two were resistant to chloramphenicol in addition.

3 urticarial reactions were noted: one on the fourth day, one on the seventh, and one on the tenth. Case 47 had severe angiœdema of face and eyes as well as an urticarial reaction. Johnston and Cazort (1953) report a case similar to this but with severe cyanosis of extremities, lips, and face; it developed on the eighth day of therapy, and the patient had had a previous course of oxytetracycline.

Transient erythema was observed in 4 cases, sometimes with mild pyrexia but with no throat lesions. The rash cleared in all cases within twenty-four hours, and usually there was no general upset. Throat cultures in 3 of these patients were negative. These signs were

observed from the eighth to the tenth day. It therefore seems that, although there are exceptions, syndromes caused by resistant staphylococci develop before the eighth day after the start of treatment (most commonly on the fourth or the fifth day) and syndromes due to drug sensitivity develop on the eighth day or later.

There were 2 deaths, and 2 children with the scarlatinal syndrome were sufficiently ill to cause anxiety. These 2 girls, sisters, had severe diarrhœa causing dehydration, and their throat lesions prevented them from swallowing; accordingly they needed intravenous fluids for several days. One of the deaths (case 1) was particularly tragic because the child was only a carrier of *Salmonella typhimurium* and on admission was clinically healthy.

This report emphasises that the broad-spectrum antibiotics are not without their dangers, all the more so because we do not yet fully understand the reasons for some of the upsets involved. Our mortality is 0·3%. Jackson et al. (1951), treating 91 pneumonia patients with oxytetracycline, observed diarrhœa in 37 cases, a resistant staphylococcus being the only, or the predominant, organism in 12 out of 18 cases in which cultures were attempted. It was thought that the staphylococcal gastro-enterocolitis might have been an important contributory factor in the fatal outcome of at least 3 of the 7 patients who died. We emphasise that the broad-spectrum antibiotics should not be used for trivial and minor illnesses.

Is the relative benignity of the side-effects we observed due to the fact that we used a smaller dosage than is generally used? Or do our local staphylococci possess invasive, pathogenic, or toxin-producing qualities different from those of brethren elsewhere? Or is it because most of our patients belonged to the younger age-groups and had not got debilitating disease? The answer to these and other questions lies in the search ahead of us.

Summary

An incidence of about 8% of side-effects was observed in 603 cases treated with oxytetracycline.

The side-effects were divided into those associated with coagulase-positive staphylococci resistant to oxytetracycline and those in which no resistant organism was isolated.

Broad-spectrum antibiotics should not be used in minor illnesses.

We wish to thank Dr. A. L. K. Rankin, physician-superintendent, Belvidere Hospital, for permission to publish; Dr. J. Ives, bacteriologist, Glasgow Royal Infirmary, Dr. Ian MacLean, bacteriologist, Belvidere Hospital, and Mr. Peter Douglas, senior laboratory technician, for their assistance; Dr. R. C. Curran for the two necropsies; and Dr. R. E. O. Williams, of the Staphylococcal Reference Laboratory, Colindale, for the phage-typing.

REFERENCES

Aranow, H. jun., Wood, W. B. jun. (1942) *J. Amer. med. Ass.* **119**, 1491.
Dearing, W. H., Heilman, F. R. (1953) *Proc. Mayo Clin.* **28**, 121.
Di Caprio, J. M., Rantz, L. A. (1950) *Arch. intern. Med.* **86**, 649.
Fairlie, C. W., Kendall, R. E. (1953) *J. Amer. med. Ass.* **153**, 90.
Finland, M. (1951) *Bull. N.Y. Acad. Med.* **27**, 199.
— Gocke, T. M., Jackson, G. G., Womack, C. R., Kass, E. H. (1950) *Arch. intern. Med.* **89**, 240.
— Grigsby, M. E., Haight, T. H. (1954) *Ibid*, **93**, 23.
Gardner, D. L. (1953) *Lancet*, ii, 1236.
Harris, H. J. (1950) *J. Amer. med. Ass.* **142**, 161.
Hazen, L. N., Jackson, G. G., Chang, S. M., Place, E. H., Finland, M. (1951) *J. Pediat.* **39** 1.
Hofer, J. W., McCaskey, G. M. (1954) *Arch. intern. Med.* **93**, 44.
Jackson, G. G., Haight, T. H., Kass, E. H., Womack, C. R., Gocke, T. M., Finland, M. (1951) *Ann. intern. Med.* **35**, 1175.
Janbon, M., Bertrand, L., Salvaing, J., Labauge, R. (1952) *Montpellier méd.* **95**, 300.
Johnston, T. G., Cazort, A. G. (1953) *Antibiot. Chemother.* **3**, 481.
Linsell, W. D., Fletcher, A. P. (1950) *Brit. med. J.* ii, 1190.
Prissick, F. H. (1953) *Amer. J. med. Sci.* **225**, 299.
Terplan, K., Paine, J. R., Sheffer, J., Egan, R., Lansky, H. (1953) *Gastroenterol.* **24**, 476.
Tomaszewski, T. (1951) *Brit. med. J.* i, 388.
Womack, C. R., Jackson, G. G., Gocke, T. M., Kass, E. H., Haight, T. H., Finland, M. (1952) *Arch. intern. Med.* **89**, 240.
Woods, J. W., Manning, I. H. jun., Patterson, C. N. (1951) *J. Amer. med. Ass.* **145**, 207.

SEE-SAW RELATIONSHIP BETWEEN HYPERTHYROIDISM AND MYASTHENIA GRAVIS

BRUCE MACLEAN
M.D. Lond., F.R.C.P.
SENIOR PHYSICIAN

J. A. C. WILSON
M.B. Edin., M.R.C.P., M.R.C.P.E.
SENIOR MEDICAL REGISTRAR

NORTH STAFFS ROYAL INFIRMARY

HYPERTHYROIDISM with myasthenia gravis has rarely been reported. Rennie (1908) described the first recorded case in Australia and referred to previous publications by Meyerstein (1904), Loeser (1904), and Brissaud and Bauer (1905).

It was later realised, as pointed out by Brain and Turnbull (1938), that external ocular paresis in association with thyrotoxic myopathy was often confused with myasthenia gravis in the past. Doubt must therefore be cast on all reported cases in the absence of confirmatory neostigmine tests. Allowance must also be made for the observation by McEachern and Ross (1942) that thyrotoxic myopathy itself shows a limited neostigmine response. Thus Thorner (1939), listing 24 reported cases, could find only 7 where the diagnosis was beyond doubt. It has been suggested that Rennie's original case was really one of exophthalmic ophthalmoplegia with thyrotoxic myopathy (Cohen 1946).

In proved cases of the combination of these two diseases there has been considerable divergence of findings as regards the effect of anti-thyroid treatment on the signs of myasthenia gravis. Partial thyroidectomy has either relieved or cured the myasthenia gravis (Kowallis et al. 1941, Thorn and Eder 1946, Sheldon and Walker 1946). Bartels and Kingsley (1949) found in a series of 12,962 cases of exophthalmic goitre 4 with complicating myasthenia gravis; they considered that anti-thyroid treatment produced no change in the myasthenic picture.

On the other hand, a "see-saw balance" between the two conditions has been described, the signs of myasthenia gravis increasing as the signs of thyrotoxicosis diminish, and vice versa. Thorner (1939) recorded a case of myasthenia gravis where the onset of thyrotoxicosis was attended by a lessening in the myasthenia, and radiotherapy of the thyroid gland made the myasthenia worse. Carrying his trial further he found that the myasthenia gravis improved under treatment with thyroid extract, but at the expense of inducing thyrotoxicosis. Thyroidectomy has been shown by Cohen (1946) and McEachern and Parnell (1948) to worsen the myasthenia gravis; and thiouracil therapy has been shown by Thorn and Eder (1946), Cohen (1946), and McEachern and Parnell (1948) to increase the myasthenia gravis. Greene (1949) has also pointed out the see-saw balance.

The case presented here shows clearly the see-saw relationship between these two conditions.

Case-report

A woman, aged 29, first reported to the medical outpatient department in August, 1948, with four months' history of illness. Three months after a normal confinement she had developed typical thyrotoxicosis, with sweating, tremors, nervousness, weakness, loss of weight, diffuse thyroid enlargement, and bilateral exophthalmos. Her doctor started treatment with methyl thiouracil 300 mg. a day for four weeks followed by a maintenance dose of 100 mg. a day. In eight weeks the patient had gained 7 lb. in weight and was feeling much steadier, but her thyroid had become larger. At that time, however, she developed a drooping of the right eyelid, more pronounced at the end of the day, when her legs felt weak and she had difficulty in swallowing. It was because of the ptosis that she was referred initially to the eye department, and thence to the medical outpatient department. Her mother had developed at puberty non-toxic thyroid enlargement, which has persisted until now. A sister in 1950

had thyrotoxicosis necessitating thyroidectomy. Two other siblings are alive and well.

On examination the patient was well built, with moderate bilateral exophthalmos but no clinical signs of thyrotoxicosis. There was ptosis of the right upper eyelid, more pronounced after repeated movements. Vision was normal, and nothing abnormal was detected elsewhere in the body. A Wassermann reaction was negative, and a radiograph of the skull was normal.

Treatment.—A test dose of neostigmine 1·5 mg. by injection abolished the ptosis completely for an hour. Thiouracil was therefore discontinued, and two or three tablets daily, each containing prostigmine 15 mg., were sufficient to control the signs of myasthenia gravis.

November, 1948.—The patient had again begun to lose weight, with signs of thyrotoxicosis, the plasma-cholesterol level being 135 mg. per 100 ml. Exophthalmos was more severe, and there was constant diplopia, with paralysis of the left superior oblique muscle. The pulse-rate had risen to 122. An injection of neostigmine 1·5 mg. caused retraction of the previously ptosed lid to a greater extent than on the other side, exposing a band of sclera. Potassium iodide gr. 6 daily was given with little or no improvement in the thyrotoxic picture.

January, 1949.—Thiouracil was again exhibited in full dosage. Within six weeks the thyrotoxicosis was satisfactorily under control, but the myasthenia gravis had become extreme, with drooping of both eyelids, general weakness, and slurring of the speech.

May, 1949.—Thiouracil was again discontinued, and the myasthenia gravis gradually improved at the expense of a mild recurrence of thyrotoxicosis. Radiography of the chest showed mild bilateral tracheal compression. The urinary excretion of creatinine was 176 mg. per 100 ml., the plasma-cholesterol level was 155 mg. per 100 ml., a glucose-tolerance test was normal, and the basal metabolic rate (B.M.R.) was +29%. Small doses of thiouracil were given in an attempt to strike a balance but had to be reduced when the myasthenia became more severe.

January, 1950.—The B.M.R. was +18%, and plasma-cholesterol level 300 mg. per 100 ml.; diplopia was still present, but evidence of thyrotoxicosis was minimal. Thiouracil therapy was again stopped.

March, 1950.—Thyrotoxic signs had reappeared, and for a fourth time thiouracil was used, with resultant control of the thyrotoxicosis and a worsening of the myasthenia gravis.

April, 1950.—Small doses of thiouracil were again given.

August, 1950.—Thiouracil treatment was stopped. The patient's appearance in October, 1950, is shown in fig. 1.

January, 1951.—Thyrotoxicosis was again manifest. Thiouracil was given once again, with improvement in the thyrotoxicosis and increase in myasthenia.

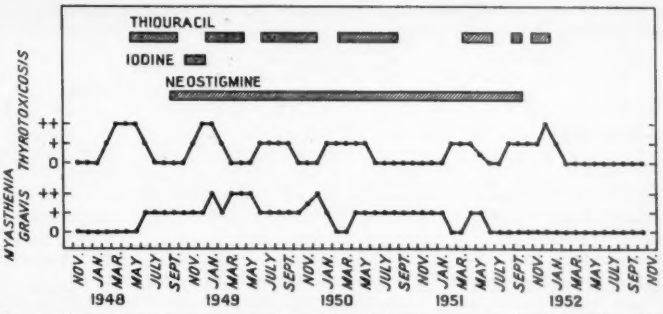


Fig. 2—Effect of treatment on combined thyrotoxicosis and myasthenia gravis: note see-saw relationship.

From June, 1951, the requirements of neostigmine, which was originally instituted in September, 1948, decreased progressively. Although a further course of thiouracil was given in November and December, 1951, myasthenia gravis did not recur. The effect of the treatment is shown in fig. 2.

February, 1952.—The patient appeared to have achieved natural recovery, and she has needed neither thiouracil nor neostigmine since then.

Follow-up.—Neither thyrotoxicosis nor myasthenia gravis has recurred. The patient's present condition is good. The exophthalmos persists, together with slight ptosis of the right upper eyelid. The patient's appearance in September, 1953, is shown in fig. 3. Eye movements are full, and the patient's weight is steady. The thyroid enlargement has regressed slightly.

Discussion

McEachern and Parnell (1948) have classified the neuromuscular disorders that may complicate thyrotoxicosis as follows:

(1) Exophthalmic ophthalmoplegia, with œdema, fatty infiltration, and swelling of the extraocular muscle-fibres.

(2) Acute thyrotoxic encephalomyopathy, presenting with bulbar palsies and relieved by anti-thyroid measures (Waldenstrøm 1945).

(3) Chronic thyrotoxic myopathy, characterised by weakness, wasting, and fasciculation of voluntary muscles.

(4) Familial periodic paralysis.

(5) Myasthenia gravis.

The present case and previously published cases (see table) supply apparently contradictory evidence about the effect of anti-thyroid treatment on myasthenia gravis. It seems therefore relevant to consider in detail the diagnostic criteria upon which the differentiation is

Fig. 1—Patient in October, 1950.

Fig. 3—Patient in September, 1953.

EFFECT OF ANTI-THYROID TREATMENT ON MYASTHENIA IN THYROTOXICOSIS

Authority	Case no.	Age (yr.)	Sex	Disease first appearing	Treatment	Effect on myasthenia gravis
				Thyrotoxic myasthenia		
Kowallis et al. (1941)	1	39	F	Thyrotoxicosis	Partial thyroidectomy	Recovery
Carson and Keynes (1942) ..	2	?	?	?	Partial thyroidectomy (toxic adenoma removed) and thymectomy	Improved, remained thyrotoxic
Sheldon and Walker (1946) ..	3	50	F	Thyrotoxicosis	Partial thyroidectomy	Recovery
Thorn and Eder (1946)	4	50	F	?	Partial thyroidectomy	Improved
				Myasthenia gravis		
Thorner (1939)	5	20	F	Myasthenia gravis	X rays	Worse
Carson and Keynes (1942) ..	6	?	M	?	Partial thyroidectomy Thymectomy	Worse Improved
Thorn and Eder (1946)	7	59	F	Myasthenia gravis	Thiouracil	Worse
Cohen (1946)	8	27	F	Myasthenia gravis	Iodine Thiouracil Partial thyroidectomy	Worse Worse Appears to have died of myasthenia
McEachern and Parnell (1948)	9	38	F	Thyrotoxicosis	Partial thyroidectomy	Worse
	10	32	F	Myasthenia gravis	Iodine Thiouracil Thyroid	Worse Worse Improved
Greene (1949)	11	?	?	Thyrotoxicosis	Thiouracil Partial thyroidectomy Thymectomy	Worse Worse Improved
Maclean and Wilson (present case)	12	29	F	Thyrotoxicosis	Iodine Thiouracil	No change Worse

made between true myasthenia gravis and thyrotoxic myopathy :

Myasthenia gravis	*Thyrotoxic myopathy*
Creatinuria	Creatinuria
Perhaps thymic enlargement	Perhaps thymic enlargement
Lymphocytosis	Lymphocytosis
Perhaps ocular palsies	Perhaps ocular palsies
Weakness worse at end of day	As weak in the mornings
Drooping of eyelids	Retraction of eyelids
Frequently bulbar palsies	Occasional bulbar palsies
Much relief from neostigmine	Limited relief from neostigmine

It has been held that bulbar palsies do not occur in thyrotoxic myopathy (Greene 1949), yet acute thyrotoxic encephalomyopathy does, and Laurent (1942) records 2 cases of severe thyrotoxicosis in which pronounced dysphagia, dyspnœa, and weakness, relieved by neostigmine, developed a week or two before death. Creatinuria, thymic enlargement, and lymphocytosis are common to both conditions. In myasthenia gravis the myasthenia is more severe at the end of the day, and the eyelids droop, whereas in thyrotoxicosis they are retracted. It seems not impossible, however, that myasthenia may relax the levator palpebræ spasm.

Response to neostigmine is usually held to be pathognomonic of myasthenia gravis, yet neostigmine has been observed to relieve the myasthenia in thyrotoxic myopathy (McEachern and Ross 1942, Waldenstrom 1945), and this cannot therefore be used as an undisputed means of differentiation.

Myasthenia in association with thyrotoxicosis may be divided into two main groups :

(1) Thyrotoxic myasthenia responds to neostigmine and is relieved or cured by anti-thyroid treatment.

(2) *Myasthenia gravis* is in most cases relieved by the onset of thyrotoxic symptoms and made worse by anti-thyroid measures. Thymectomy sometimes improves it (Greene 1949, Carson and Keynes 1942). They show a definite see-saw relationship between thyrotoxicosis and myasthenia gravis, the one waxing as the other wanes.

The present case is therefore clearly one of myasthenia gravis, being produced at will by initiating anti-thyroid treatment, and resembling the case reported by Thorner (1939), who achieved remission of myasthenia gravis with thyroid extract at the expense of inducing thyrotoxicosis.

The muscular weakness and easy fatigability in myasthenia gravis are due to a muscular metabolic defect leading to failure in chemical transmission at the neuromuscular junction, where normally acetylcholine is liberated. The administration of the anticholinesterase neostigmine, by protecting acetylcholine from destruction, rapidly alleviates the symptoms. Normal blood and muscle cholinesterase levels have been obtained in such cases, and the cause must be either deficient production of acetylcholine or the presence of a curare-like substance. If such a substance does exist, the cuff experiments of Walker (1938) would indicate that it is locally produced by muscular activity. A raised blood-thyroxine level either diminishes the production of, or inactivates, such a curare-like substance, leading to improvement in the myasthenia.

The rôle of the thymus in myasthenia gravis is obscure. It has often been found enlarged, but its size seems to have no bearing on the duration or the extent of the clinical picture according to Carson (1942). Keynes (1949), reporting on 120 survivors of thymectomy who did not have tumours, showed that 65% were virtually cured, 25% improved, and 10% unchanged. The improvement, however, is gradual, and may take a year before the optimal benefit is received.

Thyrotoxic myasthenia responding to neostigmine must be presumed to have a similar differential ætiology. No cuff experiment seems to have been done here, and the constant level of the myasthenia through the day argues a central rather than a local cause. Perhaps a constantly high blood-thyroxine level causes deficient production or rapid destruction of acetylcholine at the motor nerve-endings, thus resulting in myasthenia.

The coincidence of myasthenia gravis and malignant exophthalmos in the absence of thyrotoxicosis reported by Zondek and Ticho (1951) seems to incriminate the pituitary gland, and both conditions were in fact improved by X-ray therapy to the pituitary region. We therefore make the following suggestions :

(1) That thyrotoxic myasthenia is due to rapid destruction or defective production of cholinesterase at the myoneural junction, secondary to a high circulating thyroxine level.

(2) That myasthenia gravis is due to a curare-like substance produced locally at the site of muscle activity, and inactivated or not produced when the blood-thyroxine level is high.

(3) That there is a direct inverse relationship between the thyroid and the thymus glands, probably both under influence of the pituitary gland.

(4) That the action of the thymus gland in the production of myasthenia gravis is still obscure and appears to be secondary.

Summary

A case is presented showing the typical "see-saw" relationship between thyrotoxicosis and myasthenia gravis.

Such a relationship is always present when these two conditions are found together, and surgical intervention must therefore be regarded as dangerous.

The condition is self-limiting, and in the present case a middle course was steered between the exhausting effects of both diseases by the intermittent use of thiouracil.

Myasthenia coincident with thyrotoxicosis may be either thyrotoxic myasthenia or true myasthenia gravis. Anti-thyroid measures have directly opposing effects in these two conditions, relieving the thyrotoxic myasthenia and worsening the myasthenia gravis.

A possible mechanism by which myasthenia is produced in these diseases is suggested.

REFERENCES

Bartels, E. C., Kingsley, J. W. jun. (1949) *Lahey Clin. Bull.* **6**, 101.
Brain, W. R., Turnbull, H. M. (1938) *Quart. J. Med.* **7**, 293.
Brissaud and Bauer (1905) *Arch. Neurol. Paris*, **19**, 75.
Carson, J., Keynes G. L. (1942) *Proc. R. Soc. Med.* **36**, 140.
Cohen, B. (1946) *S. Afr. med. J.* **20**, 408.
Greene, R. (1949) *Proc. R. Soc. Med.* **42**, 263.
Keynes, G. L. (1949) *Brit. med. J.* ii, 611.
Kowallis, G. F., Haines, S. F., Pemberton, J. de J. (1941) *Proc. Mayo Clin.* **16**, 545.
Laurent, L. P. E. (1942) *Proc. R. Soc. Med.* **36**, 144.
Loeser (1904) *Z. Augenheilk.* **12**, 368.
McEachern, D., Parnell, J. L. (1948) *J. clin. Endocrin.* **8**, 842.
— Ross, W. D. (1942) *Brain*, **65**, 181.
Meyerstein, R. (1904) *Neurol. Zbl.* **23**, 1089.
Rennie, G. E. (1908) *Rev. Neurol. Psychiat.* **6**, 229.
Sheldon, J. H., Walker, R. M. (1946) *Lancet*, i, 342.
Thorn, G. W., Eder, H. A. (1946) *Amer. J. Med.* **1**, 583.
Thorner, M. W. (1939) *Arch. intern. Med.* **64**, 330.
Waldenström, J. (1945) *Acta med. scand.* **121**, 251.
Walker, M. B. (1938) *Proc. R. Soc. Med.* **31**, 772.
Zondek, H., Ticho, A. (1951) *Lancet*, ii, 1018.

SURGICAL TREATMENT OF ACUTE OSTEITIS IN CHILDHOOD

A. E. BREMNER
M.B. St. And., F.R.C.S.E.
ASSOCIATE ORTHOPÆDIC SURGEON, ROYAL VICTORIA INFIRMARY, NEWCASTLE UPON TYNE

G. A. NELIGAN
B.M. Oxfd, M.R.C.P.
LECTURER IN CHILD HEALTH, UNIVERSITY OF DURHAM

C. K. WARRICK
M.B. Lond., F.R.C.S.E., F.F.R.
ASSISTANT RADIOLOGIST, ROYAL VICTORIA INFIRMARY, NEWCASTLE UPON TYNE

From King's College, Durham University, and the Royal Victoria Infirmary, Newcastle upon Tyne

BOTH the urgency and the extent of the optimal surgical treatment of acute hæmatogenous osteitis have been sharply disputed for over twenty years (*Proceedings of the Royal Society of Medicine* 1932). The introduction of penicillin, which made possible remarkable control over staphylococcal infections as a whole, intensified this controversy. Wilkinson (1951) remarked that the question whether the administration of penicillin should be accompanied by extensive emergency surgical procedures "could be settled with certainty only by a large series in which alternate patients were operated on. Experience is still fallacious and judgment difficult even after the advent of the antibiotics."

We describe here a trial planned to decide this question. The trial covered three years from January, 1949. At that time there seemed to be considerable differences between the practice of different groups of experienced workers. Agerholm and Trueta (1946), Trueta and Agerholm (1948), and Tucker and Hollenberg (1948) held that penicillin treatment had not eliminated the need for extensive emergency surgery, but that incision of the abscess and drilling of the affected bone could be followed by primary closure of the wound. Dennison (1948) had advocated a similar procedure, without drilling of the bone. By contrast, Altemeier and Helmsworth (1945) and Altemeier and Wadsworth (1948) had decided that "emergency surgical intervention is usually unnecessary" in cases adequately treated with penicillin; they believed in allowing a clinically demonstrable abscess to form, which could be evacuated days or weeks after admission. Aird (1946), Hudson (1946), and Wilkinson (1948) appeared to agree broadly with this more conservative approach. Most conservative of all, Higgins et al. (1947) claimed that, in children, it was necessary only to aspirate pus which "formed outside the bone," at an unspecified stage of the disease. Unfortunately we felt unable to accept their conclusions at that time, because more than half their patients were less than a year old, several had already been ill for some weeks at the time of admission, and the small doses of penicillin which they recommended suggested that they had been dealing with relatively mild cases.

We found it impossible satisfactorily to assess the relative merits of these two contradictory schools of thought, because of two main omissions from their reports: there was no clear clinical definition of the type of cases treated, and the evidence did not suffice for realistic and objective comparison of the results. We therefore decided to treat a consecutive series of suitably defined cases alternately by Trueta's method and by a more conservative method (calling the two treatment groups "drilled" and "conservative"), and to try to find a satisfactory criterion for assessing and comparing the results.

Our trial was planned to supply the answers to the following three practical questions:

1. What are the clinical indications for local intervention to remove pus?
2. Where indicated, how urgent is this local intervention?
3. Should the local intervention consist in incising the abscess and drilling the affected bone, or can an open operation be avoided altogether?

Methods

SELECTION OF MATERIAL

We felt strongly that the cases for inclusion in the trial must be carefully selected from the full range of cases of acute osteitis admitted to hospital, with two main requirements in mind: (1) our series must be sufficiently uniform for comparison of results between one case and the next to be valid; and (2) the question of surgical treatment must be a real issue in every case, both so that the trial should be really critical and so that there should be no ethical objection to operation if so indicated by our method of random selection.

We selected for the trial all cases which on admission satisfied the following criteria:

Age: 2–12 years.
Grade: severe (see below).
Duration on admission: 48–168 hours.
Bone involved: major long bone of a limb.
Treatment before admission: no antibiotics.
Organism: sensitive to penicillin.

The lower *age-limit* was set at 2 years in accordance with the views of Green (1935); and although we do not fully agree with these views, our original decision proved satisfactory for the purposes which we had in mind. The upper age-limit was determined by the fact that our experiment was confined to cases in the children's wards.

Grade was judged in terms of a clinical classification of the disease which we had devised for ourselves, for lack of a satisfactory one in published reports. This classification will be described fully elsewhere, together with the details of the 96 cases of acute osteitis admitted during the trial. The severe case over the age of 1 month is defined as one in which

all the essential symptoms of the disease are fully developed within 72 hours of the onset of pain. These symptoms are taken to be: complete disability of the affected limb, pain sufficient to interfere seriously with sleep, complete anorexia, malaise sufficient to suppress all interest in recreation of any kind, and obvious feverishness. Of 50 consecutive such cases, delirium occurred in half and vomiting in a third; their temperatures on admission were 101°–107°F, and the blood-culture on admission was positive in 30. Possibly our mild cases (in which these symptoms never became fully established, or did so after more than 72 hours) correspond roughly with the "subacute" cases of some workers (*Proceedings of the Royal Society of Medicine* 1932, Dennison 1948). Such cases were excluded from the trial because we knew that in them rapid recovery could be expected with penicillin alone, without any local intervention.

Duration.—Those whose penicillin treatment was started within 48 hours of the onset were excluded for the same reason. (Of 14 such patients only 1 required local intervention.) Those whose illness was of more than a week's duration on admission were excluded because we felt that after this stage the nature of the surgical treatment was unlikely materially to affect the local lesion: the prognosis was known to be very bad, and we hoped that there would be too few such cases for purposes of comparison. Only 1 case had to be excluded on these grounds; this was a severe case of acute osteitis of the humerus of 15 days' duration, in which the abscess burst through the skin on the evening of admission.

Only *major long bones* were included because the surgical problems raised by osteitis of small and flat bones are very different, and are often individual to the particular bone.

Patients who had had any significant *antibiotic therapy* before admission were excluded because their inclusion would have introduced a variable factor which we could neither control nor allow for properly in the final assessment.

The *sensitivity of the organism* had to be defined because penicillin was regarded as an essential part of the treatment: only 1 case had to be excluded because of a resistant organism (*Staphylococcus aureus* resistant to 2000 units per ml.).

By this method of selection the number of cases included in the trial was 31 of a total of 96 cases of acute osteitis seen during the 3 years. This could hardly be described as the "large series" called for by Wilkinson (1951); but we believe it to be a far more informative series, in relation to the questions which we were trying to answer, than a much larger unselected series would have been.

The selected cases were allotted on admission alternately to one of the two treatment groups—"drilled" and "conservative"—according to the next available symbol on a chart prepared with a statistician's advice.

ASSESSMENT OF RESULTS

Our second major problem was to devise a satisfactory way of measuring the success of treatment, so that the results in our two treatment groups could be objectively compared. The method of radiographic comparison used by Agerholm and Trueta (1946) was rejected as insufficiently precise, and of doubtful relevance to the patient's welfare provided the end-result was satisfactory. The criteria described (*Proceedings of the Royal Society of Medicine* 1932) were rejected as irrelevant to cases treated with penicillin in adequate dosage. We eventually decided to try to measure the effect of the operative treatment (or lack of it) on the duration of the disease, by recording the number of days which elapsed after admission to hospital until the patient was allowed to use the limb normally, without splints (always provided that the decision to allow full activity was vindicated by satisfactory subsequent clinical and radiographic progress during a reasonable follow-up period). McAdam (1945) had published this information about some of his cases.

This method appeared to have the advantages that the result could be expressed numerically; it was an expression of what mattered most to the patient; and, above all, it was a fact and not a personal impression. Of course personal judgment did enter into the decision to allow full activity; but the decision in each case was made by the same group of three people and in accordance with well-defined clinical and radiographic signs (Neligan and Warrick 1953), so that there was a high degree of uniformity and minimal scope for any unconscious personal bias. The method appeared to us to be satisfactory in practice. In 1 "drilled" case (table I, case 9) infection recurred two weeks after the patient was first allowed to walk; a further period of restricted activity was necessary, and the duration of disability was reckoned to the end of this second period.

When it came to the final assessment, however, it was clearly unrealistic to compare the results in a weight-bearing bone, such as the tibia, with those in the arm-bones or fibula; so the series was ultimately reduced to the 23 cases in which the femur or the tibia was involved. This need had been foreseen, and the chart used for allocating the selected cases to the two treatment groups on admission was designed accordingly, with separate subgroups for each bone.

General Management

The penicillin therapy and general management of the cases in the two treatment groups was identical in all respects, except for minor differences implicit in the different surgical techniques:

Penicillin.—50,000 units intramuscularly was administered 3-hourly for 21 days at least, and thereafter until the bone was free of tenderness and the erythrocyte-sedimentation rate (E.S.R.) was decreasing steadily and had reached about 20 mm. in 1 hour (Westergren).

Intravenous Therapy.—Plasma, blood, or electrolyte solutions, as indicated, were given in 2 "drilled" and 3 "conservative" cases.

Immobilisation was achieved by padded plaster back-splint or a sling in all cases where it could make the patient more comfortable. To avoid disuse osteoporosis, such immobilisation was stopped as soon as the limb was free of pain and any wound was healed. But in 5 cases the limb was put into a plaster cast when the patients were sent home at the end of the course of penicillin, because we thought that these patients were unlikely to keep off the leg voluntarily until we gave permission for weight-bearing.

Free Activity.—The decision to allow this depended on a satisfactory clinical condition and certain radiographic criteria (Neligan and Warrick 1953). Absence of any decalcification within 28 days of the onset, or the first signs of recalcification in previously decalcified areas, were taken to indicate that a fracture need not be feared. The only exception was case 14 (in the "conservative" group), where decalcification was so gross that we waited for the third set of films showing recalcification before regarding the tibia as safe for weight-bearing.

Surgical Treatment

In the "*drilled*" *group* the surgical treatment was that described by Trueta and Agerholm (1948). But we have subsequently found out (Trueta 1952) that in two details our technique differed from that used by these workers:

1. In many of our cases the wound was not examined until the 10th day after operation, when the stitches were removed. This omission, however, does not appear to have been directly related to delay in healing; and a hæmatoma was evacuated on the 4th day in the only case where the wound broke down completely and required secondary suture (case 12).

2. In 9 of the 12 cases interrupted catgut sutures were used to approximate the periosteum or the muscle sheath, or both, before closing the skin. This procedure was very definitely related to delay in healing of the wound (see table I); but in no case did this delay cause postponement of weight-bearing. Trueta states that he too had noted this tendency of buried catgut to interfere with the healing of the wound, and had eliminated periosteal sutures from his technique some years previously.

In the "*conservative*" *group*, by contrast, there was no detailed description of any accepted method of local treatment for us to follow. Table II shows that in the first 5 cases in this group we failed to achieve the objective of avoiding open operation. In these 5 cases aspiration was omitted or done in a way which we now regard as

half-hearted and ineffective; but the operation was confined to incision of the periosteum and evacuation of the underlying pus, followed by suture of the wound. When once we had realised that the subperiosteal abscess could be adequately emptied by thorough aspiration, carried out as soon as possible and repeated if necessary, the whole picture altered. We were able, by this means, to avoid operation in 4 of the last 6 cases (the remaining 2 required no local treatment for the evacuation of subperiosteal pus). A further 15 similar cases have since been treated satisfactorily by aspiration alone.

Where indicated, we now carry out the first aspiration within hours of starting penicillin treatment. The patient is given an appropriate dose of sodium quinalbarbitone ('Seconal Sodium') orally and morphine hypodermically about three-quarters of an hour before the aspiration. With a full aseptic technique, and using autoclaved instruments, a short, wide-bore needle (a "taking" transfusion-needle, B.S.W.G. 13, 3·5 cm. long, has proved suitable and convenient) is plunged through the tissues into contact with the bone at the site where the abscess is judged to be maximal; the thick pus may flow out slowly under pressure, or may need to be aspirated. If no pus is found at the first attempt, the needle is withdrawn slightly and reinserted down to the bone at a different angle. Where the abscess is very extensive we have thought it wise to aspirate it at two separate sites, to ensure adequate emptying; but this may not be necessary at subsequent aspirations, when the material is more fluid. A small dressing is placed over the puncture-hole for a few hours afterwards. We have not injected penicillin into these abscesses; but when an infected joint has been aspirated penicillin has been injected in the usual way (cases 14 and 21).

The unequivocal indication for initial local intervention is, we believe, the presence of a subperiosteal abscess; but we have not found it necessary to wait for the formation of an abscess demonstrable on ordinary

TABLES I AND II—23 SELECTED CASES OF SEVERE ACUTE OSTEITIS OF FEMUR AND TIBIA OF MORE THAN 48 HOURS' DURATION IN PATIENTS AGED 2–12 YEARS

"DRILLED" GROUP

Case no.	Age (yr.)	Duration on admission (hr.)	Site	Ml. of pus (estimated)	Period (days) from admission till					Follow-up		
					Wound healed	Afebrile	Free of tenderness	Penicillin stopped	Weight-bearing allowed	Duration (yr.)	Latest radiographs	
											Sclerosis	Broadening
1	4	50	Femur upper shaft	2	11	4	16	35	72	4	None	Mild
2	8	104	Tibia lower shaft	75	28*	5	10	28	61	4½	None	Mild
3	5	50	Tibia lower shaft	5	11	4	11	21	33	4	None	None
4	8	56	Femur upper shaft	0	9*	6	13	22	36	4	None	None
5	9	82	Tibia lower shaft	0	25*	7	16	21	47	4	None	Mild
6	6	145	Tibia upper shaft	50	11	3	11	21	22	3½	None	Mild
7	8	96	Femur lower shaft	5	26*	7	10	26	55	2½	None	Mild
8	9	144	Tibia lower shaft	10	28*	4	15	29	42	2½	Mild	None
9	3	70	Tibia ? bipolar	60	32*	10	25	32 (+24)	(62) 152	3	None	Mild
10	9	144	Tibia lower shaft	30	19*	5	20	23	74	2	None	Mild
11	11	57	Tibia lower shaft	15	55*	7	14	30	61	2	Mild	Mild
12	10	120	Femur lower shaft	2	73*	6	?	34	80	2	Mild	Mild
Average	..	*91*	..	..	*27*	*6*	*15*	*29*	*61*	..	..	..

* Interrupted catgut sutures used to close either the periosteum or the muscle sheath.

"CONSERVATIVE" GROUP

Case no.	Age (yr.)	Duration on admission (hr.)	Site	Period (days) from admission till						Follow-up		
				Aspiration (ml. of fluid in parentheses)	Operation	Afebrile	Free of tenderness	Penicillin stopped	Weight-bearing allowed	Duration (yr.)	Latest radiographs	
											Sclerosis	Broadening
13	11	144	Tibia lower shaft	1(4), 2(0)	2	4	22	24	80	4	Mild	None
14	3	120	Tibia upper shaft	16, 18 (knee)	9	18	26	32	121	4½	None	None
15	11	108	Femur lower shaft	..	2	4	37	37	65	4	None	Mild
16	7	130	Tibia upper shaft	4(25)	7	3	17	22	69	4	None	Moderate
17	12	104	Tibia lower shaft	2(25), 4(20)	5	6	13	21	54	3½	None	Mild
18	12	108	Femur neck	..	..	8	20	31	68	3	None	None
19	3	56	Tibia upper shaft	1(10), 3(10), 5(14), 11(20), 16(10)	..	7	25	35	79	2½	None	Moderate
20	8	100	Tibia lower shaft	2(15)	..	5	17	23	31	2½	None	None
21	10	86	Tibia lower shaft	2, 3, 4, 5 (ankle)	..	8	16	22	35	2	None	None
22	2	90	Tibia upper shaft	1(30), 2(23), 4(35), 6(40), 8(33), 14(20)	..	8	11	27	46	2½	None	Mild
23	10	120	Tibia lower shaft	0(50), 1(8), 5(35) 8(30), 12(25), 16(48)	..	9	30	30	61	1½	Moderate	Mild
Average	..	*106*	..	..	..	*7*	*21*	*28*	*64*	..	..	..

clinical examination, as suggested by Altemeier and Wadsworth (1948), nor does our experience in case 14 suggest that it is safe to do so.

The difficulty is that it is usually impossible to detect fluctuation on ordinary clinical examination when the pus is in a tense collection deep to the exquisitely tender periosteum. But we know that a subperiosteal abscess is likely to be present in any severe case of acute osteitis where penicillin treatment has not been started within 48 hours of the onset of pain. If, in such a case, the tenderness extends along the shaft of the bone well beyond the limits of the affected metaphysis, with swelling of the overlying tissues, we act on the assumption that an abscess is present; for our experience suggests that this extension of tenderness is usually produced by extension of pus deep to the periosteum. If the patient is then examined under heavy sedation, so that tenderness is eliminated, the fluctuation is usually detectable. In this way the presence and the position of the abscess can be determined with certainty in the great majority of cases and the site of the aspiration planned accordingly. Failing this, we have been guided by the area of greatest tenderness, and have not failed to find the abscess with the aspirating needle since our first case.

We have repeated the aspiration as often as a fluctuant collection of fluid reaccumulates, or until the aspirated material is sterile on culture. Detection of fluctuation is much easier after the initial aspiration both because the tissues are less tense and tender and, we believe, because some of the fluid is relatively superficial, having leaked out from beneath the periosteum through the holes made by the needle.

Comparison of Results

The results of the trial, set out in tables I and II, show no significant difference between the two treatment groups, judging by our main criterion: the average number of days from admission until free weight-bearing was allowed and found to be safe was 61 for the "drilled" and 64 for the "conservative" cases. Examination of the two groups for factors likely to affect the prognosis shows only one significant difference: the average duration on admission in the "conservative" group was, by chance, some 15 hours greater than in the "drilled" group. Judging by the average duration of fever and of penicillin treatment, there is again no significant difference between the two groups. The average duration of tenderness, however, was shorter in the "drilled" group (15 as compared with 21 days); but in no case did the tenderness persist long enough to affect adversely the general management of the case, and its distribution did not suggest persistence of metaphyseal infection. A preliminary survey of the radiographic appearances up to the present time does not show any clear-cut difference between the two groups except that the amount of subperiosteal calcification is certainly greater in the "conservative" cases in the early stages. This follow-up is being continued to see whether there is any difference in the time taken for the affected bones to regain a normal appearance. The fact that in each case successive radiographs are showing a steady return towards normal is our justification for publishing the results after such a relatively short follow-up period.

In 2 cases the period of disability was unduly long:

Case 9.—This patient in the "drilled" group had a clinical recurrence of infection, as already mentioned, 2 weeks after he was first allowed to bear weight. In retrospect, we may have made a mistake in stopping his penicillin treatment on the 32nd day, after his E.S.R. had risen from 30 to 37 mm. in 1 hour (Westergren) during the previous week; but his course of penicillin was longer than the average for the series. Although the recurrence settled well with penicillin and immobilisation, and no further period of restricted activity has been necessary, he had a minor recurrence a year later during which he spontaneously discharged a minute sequestrum, and penicillin-sensitive *Staph. aureus* was grown from material aspirated from his tibia. He had a further minor recurrence, due to the same organism, another year later, and is regarded as a possible chronic case. This result is most unsatisfactory.

Case 14.—Our failure in this case in the "conservative" group, on the other hand, can confidently be attributed to our inexperience of the method. His operation was delayed for 9 days after admission, because of severe vomiting and diarrhœa among other factors; no aspiration was carried out during this period because we had not yet realised how much can be achieved in this way. This was the one case, therefore, in which an abscess obvious on ordinary clinical examination was allowed to develop, and in the light of subsequent experience we have no doubt that this avoidable delay in local intervention caused the gross decalcification of the tibia which occurred during the next 10 weeks; this was quite out of proportion to what we saw in any other case. This was also the only case in either group in which septic arthritis developed during penicillin treatment.

Conclusions

Any conclusions are applicable only to the type of case included in the trial. Some of the most difficult surgical problems in the treatment of acute osteitis arise in the newborn, and in older children whose lesion is in the neck of the femur; our results are not strictly relevant to these problems, since the newborn were deliberately excluded and only 1 older child with a lesion of the neck of the femur chanced to qualify for inclusion. But we think that the principles suggested by our results can be applied to these problems, and to lesions of short or flat bones.

We think that these principles, in terms of our initial questions, are as follows:

1. The clinical indications for local intervention are the signs of a subperiosteal abscess, as already described. Such an abscess is likely to be present in any severe case of acute osteitis where treatment has not been started within 48 hours of the onset.

2. When these indications are present it is a matter of some urgency to evacuate the pus, and we believe this should be done within 24 hours of admission or as soon afterwards as the abscess can be accurately located.

3. There appears to be no certain advantage in open operation with drilling of the bone. By the criterion we have used, the results are as good in cases treated by thorough aspiration of the subperiosteal pus, repeated when necessary. This result is not inconsistent with the finding that a subperiosteal abscess cannot be completely emptied by a single aspiration (Agerholm and Trueta 1946, White and Dennison 1952). That the aspiration may help indirectly, by allowing escape of pus into the soft tissues, is suggested by case 4. At operation 3 days after a single aspiration, no frank pus was found; but we saw a half-inch rent in the periosteum and some bloodstained seropus in the soft tissues.

Since our experience did not suggest any essential difference in the results likely to be achieved on the one hand by extensive emergency surgery and on the other by aspiration of pus, we felt free to base our choice on a comparison of the intrinsic merits and convenience of the two methods. The more conservative method has the advantages that a major operation under general anæsthesia is avoided; that there is no risk of the troubles associated with slow wound healing; that the first aspiration can be made within a few hours of admission even in cases where the patient would not be considered fit for operation; and that the patient is left unscarred. The advantage of extensive emergency surgery is that, once the operation has been done, there is no more that can be done, and there is no need for daily reassessment of the local condition with a view to further local treatment (except such as is required by the wound). We decided in favour of the more conservative method, and the results have been satisfactory so far; but we feel that success with this method demands a high standard of clinical judgment, with daily reassessment, and may not be achieved consistently except in centres where many cases are seen.

Summary

A trial was carried out in the years 1949–51 to decide whether in the treatment of acute hæmatogenous osteitis in childhood administration of penicillin should be supplemented by extensive emergency operation.

Of 96 cases admitted to hospital under our care, 23 satisfied the criteria for inclusion in the trial. Consecutive cases were treated alternately: (*a*) by open operation, including drilling of the bone; and (*b*) by a more conservative method, in which we came to rely on aspiration of pus from the subperiosteal abscess as the sole surgical measure.

The main criterion for assessing the results was the duration of disability after treatment was started. By this criterion there was no significant difference between the results with the two methods, and no important difference was found in respect of any other criteria.

Because of its intrinsic advantages, we selected the conservative method for routine use; but its successful application depends on good clinical judgment and on daily reassessment in the early stages.

We thank all those colleagues, surgeons and pædiatricians, who made this study possible by allowing us to assume clinical responsibility for patients who would otherwise have been theirs, and particularly to Sir James Spence and Dr. Donald Court for their constant encouragement and help. Mr. F. D. Hindmarsh, Mr. J. D. T. Jones, and Mr. J. A. Key were kind enough to operate on three patients in such a way that they could be included in the trial. We have also received invaluable help and guidance, both in the planning of the experiment and the presentation of the results, from Mr. H. Campbell, B.A., F.S.S. Prof. J. Trueta's interest, and his willingness to spare time to discuss this work, have been of the greatest help.

REFERENCES

Agerholm, M., Trueta, J. (1946) *Lancet*, i, 877.
Aird, I. (1946) *In* Penicillin, its Practical Application. London; p. 202.
Altemeier, W. A., Helmsworth, J. A. (1945) *Surg. Gynec. Obstet.* **81**, 138.
— Wadsworth, C. L. (1948) *J. Bone Jt Surg.* **30A**, 657.
Dennison, W. M. (1948) *Ibid*, **30B** 110.
Green, W. T. (1935) *J. Amer. med. Ass.* **105**, 1835.
Higgins, T. T., Browne, D., Bodian, M. (1947) *Brit. med. J.* i, 757.
Hudson, R. V. (1946) *Proc. R. Soc. Med.* **39**, 371.
McAdam, I. W. J. (1945) *Brit. J. Surg.* **33**, 167.
Nelligan, G. A., Warrick, C. K. (1953) *J. Fac. Radiol., Lond.* **5**, 112.
Proceedings of the Royal Society of Medicine (1932) **25**, 517.
Trueta, J. (1952) Personal communication.
— Agerholm, M. (1948) *Postgrad. med. J.* **24**, 229.
Tucker, F. R., Hollenberg, C. (1948) *Lancet*, i, 701.
White, M., Dennison, W. M. (1952) *J. Bone Jt Surg.* **34B**, 608.
Wilkinson, F. R. (1948) *J. Pediat.* i, 796.
— (1951) *J. Bone Jt Surg.* **33B**, 6.

RESISTANT VENTRICULAR TACHYCARDIA
CURED WITH LARGE DOSES OF PROCAINAMIDE

R. E. LOVELACE, M.B. Lond., HOUSE-PHYSICIAN
G. DALAWELL WALKER, D.M. Oxfd, M.R.C.P., SENIOR MEDICAL REGISTRAR
NORTH MIDDLESEX HOSPITAL, LONDON

IT is now established that procainamide is superior to quinidine in the treatment of ventricular tachycardia. The effective dose, which varies considerably, is usually 300–800 mg. intravenously, but a few cases require larger doses. The case reported here illustrates the need for, and method of, administration of larger doses of procainamide than usual, and suggests that the speed of injection may be important.

Case-report

A man, aged 65, was admitted on Nov. 9, 1953, with a history of sudden onset of palpitations a week previously. These continued uninterrupted, and there was increasing dyspnœa. Two years before he had had a myocardial infarct, with subsequent angina of effort and attacks of similar palpitations lasting from two to ten minutes. He had chronic bronchitis. Before admission he had received without benefit oral quinidine gr. 6 thrice daily for five days, followed by digitalis folia gr. 1 twice daily for two days.

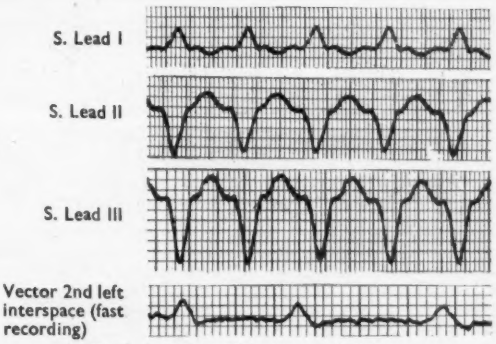


Fig. 1—Electrocardiograms on admission.

On admission he had a regular tachycardia of 180 with signs of moderately severe congestive failure, and early cure was considered imperative. Electrocardiography showed ventricular tachycardia, so the following schedule of treatment was started: oral procainamide 1 g. four-hourly; rectal aminophylline 0·35 g. four-hourly; oral promethazine 25 mg. four-hourly; phenobarbitone gr. $^1/_2$ thrice daily; amylobarbitone sodium gr. 3 every night; and mersalyl 1 ml. intramuscularly on alternate days.

2nd day.—The heart-rate was regular at 164, and the arm-tongue circulation-time exceeded 60 sec. Intravenous procainamide 1000 mg. was given at 50 mg. a minute; and the pulse-rate and blood-pressure were recorded, and an electrocardiogram (C.F.4) was made with a standard portable electrocardiograph, at intervals of a minute. The pulse slowed to a minimum of 112 after 700 mg. of procainamide had been given, and the lowest systolic pressure was 100 mm. Hg.

3rd day.—The congestive failure had improved, and the circulation-time was 18 sec. Intravenous procainamide 1000 mg. at 100 mg. a minute was followed half an hour later by 1000 mg. at 200 mg. a minute. The pulse-rate before, between, and three hours after the injections was 160; and it slowed during each injection, reaching a minimum of 110 towards the end of the second injection. At that point the lowest systolic pressure (90 mm. Hg) was recorded.

4th day.—Intravenous procainamide 1600 mg. was given at 160 mg. a minute; the pulse-rate fell to 100 and the systolic blood-pressure to 60 mm. Hg, but within twenty minutes the pulse-rate rose to 130. A further 1200 mg. was injected at 50 mg. a minute, and the pulse-rate again fell to 100 and the systolic blood-pressure to 80 mm. Hg. Again this proved transient. After this large dose of 2800 mg. the patient complained of irritation of his back and was confused, becoming about an hour later euphoric, hyperkinetic, deluded, and hallucinated. This condition lasted until it was controlled with intramuscular amylobarbitone sodium gr. 6 and intramuscular paraldehyde 10 ml.

5th day.—The patient was greatly improved but remained euphoric, had transient diarrhœa, and was febrile. A leucocyte-count was normal, and stool culture was negative. Treatment with penicillin 250,000 units four-hourly was started.

6th day.—Intravenous procainamide 1500 mg. was given at 400 mg. a minute, and nodal rhythm was established at 80. The lowest systolic pressure (65 mm. Hg) was recorded a minute later. Nodal rhythm at 80 was still present thirty minutes later, and that heart-rate was maintained until the patient was discharged.

7th day.—A purpuric rash appeared on the patient's back, and oral procainamide was discontinued in favour of quinidine gr. 3 thrice daily. A leucocyte-count was normal, and platelets were plentiful in a film.

8th day.—Electrocardiography showed sinus rhythm.

12th day.—The patient was quite free from cardiac failure and got up; his erythrocyte-sedimentation rate was 16 mm. in 1 hr. (Westergren).

21st day.—The patient was discharged and told to continue taking quinidine.

Electrocardiography on admission (fig. 1) showed a rapid regular succession of ectopic ventricular complexes arising in one focus, probably posterior; the main deflection in C.F.4 (fig. 2*a*) was a wide slurred R wave. During the

Time marker = $^1/_{10}$ and $^1/_{50}$ sec.

Fig. 2—Successive changes in C.F.4 electrocardiograms on intravenous injection of procainamide: *a*, simple slowing; *b*, sporadic substitution by complexes arising from another focus; *c*, appearance of isolated complexes (probably nodal extrasystoles); *d*, nodal rhythm.

intravenous injection of procainamide the following changes were observed successively: (1) simple slowing (fig. 2*a*); (2) sporadic substitution by complexes arising from another (probably also posterior) focus (fig. 2*b*); (3) the appearance of isolated complexes (Q S lasting 0·1 sec. in C.F.4 [fig. 2*c*]), probably nodal extrasystoles by comparison with the next stage; and (4) nodal rhythm (fig. 2*d*). On the first two occasions (second and third days) changes 1 and 2 were noted; on the fourth day change 3 followed; and on the sixth day change 4 was reached. At no time was widening of the Q R S complex observed. The final electrocardiogram showed evidence of old posterior infarction (fig. 3).

Comments

As previously reported by other workers, quinidine and oral procainamide failed, but intravenous procainamide eventually succeeded. The intramuscular route was not tried.

With proper precautions it was possible to give intravenous doses larger and faster than is usually recommended (1000 mg. in ten minutes). Minute-by-minute control was essential because individual tolerance varies and serious toxicity may develop with the minimal effective dose. 7300 mg. was given in five days, with a daily maximum of 2800 mg. and a maximal single injection of 1600 mg. Noradrenaline 4 µg. per ml. was immediately available in case of serious hypotension but was not needed.

The first injection was given at 50 mg. a minute (half the recommended speed). Later the dose and the rate of injection were alternately increased. The final and curative injection, though not the largest, was the fastest (400 mg. a minute), and speed was considered an important factor in its effectiveness. Rapid injection increased the hypotensive side-effects, and there is evidence that it may delay intraventricular conduction excessively (Zapata-Diaz et al. 1952), but this was not seen here. We suggest reserving its use for cases proved resistant to injection at the usual rate. Use of direct-writing electrocardiography to detect widening of the ventricular complexes before fibrillation develops would improve the technique. The most troublesome side-effect was the hyperkinetic confusional psychosis which followed two successive large doses.

Rashes and fever have been reported following oral therapy, and there is evidence that they may be allergic. The promethazine already given may have modified their severity (Koffler 1953) in the present case. Agranulocytosis has also been reported, but we have found no previous observation of purpura with a normal leucocyte-count. Diarrhœa is also apparently a new finding.

Nodal rhythm has been produced experimentally (in dogs) with procainamide, and its transient appearance, as in the present case, noted before (Schoolman et al. 1953). It is probably due to direct suppression of the sino-auricular node.

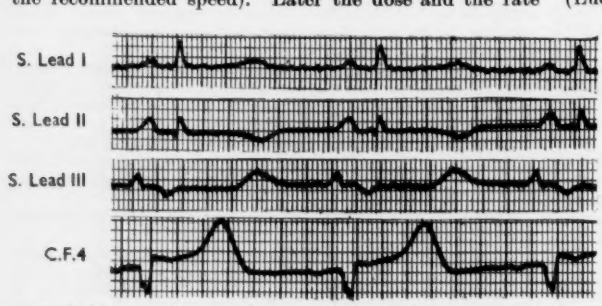


Fig. 3—Electrocardiograms showing evidence of old posterior infarction.

Discussion

In resistant ventricular tachycardia intravenous procainamide appears often more successful than oral therapy (Antzis et al. 1952, Hanenson et al. 1952, and others), but oral quinidine in full doses may be as successful as oral procainamide (Antzis et al. 1952, Schaffer 1951). Schaffer states that the anti-arrhythmic activity of oral procainamide is from a quarter to a third of that of quinidine (equal absorption stated); and the rate of removal of procainamide from the blood-stream is twice as rapid as that of quinidine (Kayden et al. 1951).

In the present case the urgency did not permit trial of either massive quinidine therapy (gr. 2–6 each hour until toxicity was manifested) or intramuscular procainamide (*Lancet* 1952), either of which might have been successful.

In previous published reports the curative intravenous dose has been 300–800 mg., but some cases have needed more (Kelley et al. 1952, Schoolman et al. 1953) and some cases less—e.g., 60 mg. (Stearns et al. 1952). Our patient received 1000 mg. intravenously at 50 mg. a minute at first; next day 1000 mg. at 100 mg. a minute, this dose being repeated half an hour later at 200 mg. a minute; and the day after 2800 mg. an hour (1600 mg. at 160 mg. a minute and, after twenty minutes, 1200 mg. at 50 mg. a minute). After a day's rest 1500 mg. was given at 400 mg. a minute, ceasing immediately the pulse-rate fell to 80. The fact that speed increases the hypotensive side-effects has not been always found (Lucas and Short 1952, using smaller doses), and some workers also found that no better results followed rapid injection (Miller et al. 1951, using doses of 250–500 mg. at a rate of up to 500 mg. a minute). Further study of resistant cases treated with larger doses is needed. Two more disadvantages of rapid injection are the increased risk of intraventricular block (Zapata-Diaz et al. 1952) and the difficulty of close observation.

When procainamide is administered intravenously, the blood-procainamide level soon declines, perhaps 10–15% per hour (*Journal of the American Medical Association* 1950); and, as in previous reports (Miller et al. 1951, effect lasting from six minutes to two hours), we found its action on the heart transient, a second dose half an

hour later being little more effective than the first. With these larger doses we found speed to be relatively more important than size, but owing to the considerable dangers (cardiodepression and hypotension) involved in these methods, we would restrict such doses to very special cases.

As necessary precautions against hypotension, it is essential to observe the patient closely, measuring the systolic pressure every half-minute; to have antidotes ready (e.g., phenylephrine [Stearns et al. 1952]) and/or to take prophylactic measures (e.g., slow noradrenaline drip [Schoolman et al. 1953]). The other chief danger is the production of ventricular fibrillation. The cases for treatment can first be selected by excluding those with disease of the intraventricular conducting mechanism, because of the danger that procainamide may produce fibrillation, which may be fatal (Read 1952). Ideally progress should be observed by direct-writing electrocardiography so that any widening of QRS (recommended maximam 50%), with subsequent notching or prefibrillary complexes (Denney et al. 1952), could be detected immediately and suggest caution or a halt. We merely observed the result of each injection in retrospect and, finding no such change, increased the rate and dose accordingly. Bifocal extrasystoles of ventricular origin (fig. 2*b*) were regarded with timidity, but the appearance of possible supraventricular complexes (nodal extrasystoles) was encouraging and suggested steady progress. It has also been suggested that the atrioventricular node is more sensitive to depression than the ectopic ventricular focus (Schack et al. 1952, Bernstein et al. 1952), but this suggestion seems to be in conflict with the appearance of nodal rhythm during cure.

As regards unavoidable toxicity, the acute confusional psychosis with prominent cerebral stimulation was not in agreement with previous experience (*Journal of the American Medical Association* 1950). This psychosis followed the administration of 2800 mg. of procainamide in an hour; so it is possible that blood-procainamide levels capable of stimulating the cerebral cortex may not have been reached before in man. In one case (Bakos and Askey 1952) restlessness and a desire to go home were manifested after oral procainamide 250 mg. had been given four-hourly for five doses.

Agranulocytosis and rashes have been reported following oral therapy with procainamide (Antzis et al. 1952), but the present case showed no blood disorder. However, immediately before the observation of petechiæ both in our case and in one reported by Antzis et al. (which later developed agranulocytosis) penicillin therapy had been started for pyrexia of unknown causes. This might have been only coincidental.

Pyrexia has been severe in some cases, and for both it and other toxic effects—e.g., urticaria, malaise, and nausea—an allergic basis has been suggested (Koffler 1953, Hellman 1952). In one case (Bakos and Askey 1952) pyrexia was specifically reproducible; in others it was associated with eosinophilia (Hellman 1952 and others) and responded to anti-histamine drugs. Intravenous procainamide given to two asthmatic patients produced convulsive movements and shock (Stearns et al. 1952). If promethazine had not been used in the present case, the temperature might well have risen higher than was observed here (100·4°F), and more side-effects than irritating purpura and diarrhœa might have developed.

Perhaps the fact that these effects follow oral procainamide mainly is reason for using quinidine as much as possible for oral curative therapy, and perhaps entirely for maintenance.

Conclusions

Intravenous procainamide should only be used in urgent cases and with the greatest possible precautions; and higher doses and speeds of administration should only be used, and then cautiously, in proved resistant cases. The use of prophylactic anti-histamine drugs during procainamide therapy is desirable, and quinidine should be used for oral therapy where possible.

Summary

A case is reported of ventricular tachycardia with cardiac failure. After other methods had failed, cure was effected with intravenous procainamide given faster and in larger dosage than is usually recommended.

We wish to thank Dr. R. Kempthorne for permission to publish this case and for helpful criticism in the preparation of this paper; Dr. J. F. Heggie for his advice about the illustrations; Dr. L. A. Hamilton for his assistance and advice; and Mrs. I. P. Vedast for preparing the electrocardiograms.

REFERENCES

Antzis, E., Dunn, J. J., Schillero, A. J. (1952) *Amer. Heart J.* **43**, 911.
Bakos, A. C. P., Askey, J. M. (1952) *J. Amer. med. Ass.* **149**, 1393.
Bernstein, L. M., Pascale, L. R., Littmann, A., Foley, E. F. (1952) *Ibid*, **150**, 446.
Denney, J. L., Miller, H., Griffith, G. C., Nathanson, M. H. (1952) *Ibid*, **149**, 1391.
Hanenson, I. B., Kayden, H. J., Messinger, W. J. (1952) *Amer. Heart J.* **43**, 293.
Hellman, E. (1952) *J. Amer. med. Ass.* **149**, 1393.
Journal of the American Medical Association (1950) **144**, 1465.
Kayden, H. J., Steele, J. M., Mark, L. C., Brodie, B. B. (1951) *Circulation*, **4**, 13.
Kelley, R. T., Keegan, C. E. jun., Katter, G. W. (1952) *Amer. Heart J.* **44**, 851.
Koffler, A. (1953) *J. Amer. med. Ass.* **152**, 28.
Lancet (1952) ii, 1025.
Lucas, B. G. B., Short, D. S. (1952) *Brit. Heart J.* **14**, 470.
Miller, H., Nathanson, M. H., Griffith, G. C. (1951) *J. Amer. med. Ass.* **146**, 1004.
Read, J. M. (1952) *Ibid*, **149**, 1390.
Schack, J. A., Hoffman, I., Vesell, H. (1952) *Brit. Heart J.* **14**, 465.
Schaffer, A. I. (1951) *Amer. Heart J.* **42**, 597.
Schoolman, H., Pascale, L. R., Bernstein, L. M., Littman, A. (1953) *Ibid*, **46**, 146.
Stearns, N. S., Callahan, E. J., Ellis, L. B. (1952) *J. Amer. med. Ass.* **148**, 360.
Zapata-Diaz, J., Cabrera, E., Mendez, R. (1952) *Amer. Heart J.* **43**, 854.

A POTENT GROUP-O CELL-AGGLUTININ OF HUMAN ORIGIN WITH H-SPECIFIC CHARACTER

WINIFRED M. WATKINS
B.Sc., Ph.D. Lond.
BEIT MEMORIAL RESEARCH FELLOW

W. T. J. MORGAN
Ph.D., D.Sc. Zürich and Lond., F.R.S.
PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF LONDON

From the Lister Institute of Preventive Medicine

SERA which agglutinate group-O and group-A_2 cells preferentially can be divided into two groups on the results of inhibition tests with saliva: those whose power to agglutinate such cells is inhibited by saliva from secretors belonging to any of the groups within the ABO system are designated anti-H, and those whose power is not inhibited are provisionally grouped together and called anti-O (Morgan and Watkins 1948).

It should, however, be realised that, although the latter sera are grouped together as anti-O, the results of inhibition tests with secretions from various sources, and the behaviour of the sera with the erythrocytes of group-O cord-blood (Watkins 1952), suggest that not all the sera classified as anti-O are of the same specificity. It is still not known which, if any, of these anti-O sera react specifically with the product of Bernstein's *O* gene.

Both O and H agglutinins are found among human sera; but anti-O sera are found more often. Both kinds of antibodies usually behave as cold agglutinins and are of low potency. The differentiation into anti-H and anti-O on the basis of inhibition by saliva is clear-cut, but it is impossible to distinguish between the two kinds of antibody on the basis of their reactivity with red cells.

TABLE I—REACTIVITY OF ERYTHROCYTES WITH SERUM "TOMLINSON" AT 21°C AFTER ABSORPTION OF SERUM WITH GROUP-A_1B CELLS

Group	No. of samples tested	No. of samples showing agglutination titre of													
		0	1/2	1/4	1/8	1/16	1/32	1/64	1/128	1/256	1/512	1/1024	1/2048	1/4096	1/8192
O	39	..	..	..	..	..	..	..	..	..	..	4	28	7	..
A_1	42	3	3	..	1	1	2	9	7	7	5	4	..	..	..
A_2	9	..	..	..	..	..	..	..	..	..	..	5	4	..	..
B	10	..	..	..	..	..	..	..	1	..	3	6	..	..	..
A_1B	5	1	..	1	1	..	1	1	..	..	..	..	..	..	..
A_2B	2	..	..	..	..	..	..	..	..	1	..	1	..	..	..

Bhende et al. (1952) reported three examples of Indian blood with a "new" blood-group character related to the ABO system. The serum from each of the men contained anti-A_1, anti-A, and anti-B agglutinins, and the cells were not agglutinated by either anti-A or anti-B sera. Superficially, therefore, these men appeared to belong to group O, but their red cells were not agglutinated by human or by animal anti-H sera or by human anti-O sera, and their sera contained in addition group-O cell-agglutinins of greater potency than any which had hitherto been examined. Two of the sera gave a titre of 1 in 256 against group-O cells, and the third a titre of 1 in 32. Moreover these sera were active at 37°C, and the degree of agglutination was the same at 37°, 24°, 12°, and 5°C. The agglutination of group-O cells by each of the three sera was inhibited by saliva from group-O secretors; these sera were therefore classified as anti-H. The sera were not used to test the H-reactivity of red cells belonging to groups other than O, because of the presence of the anti-A, anti-A_1, and anti-B agglutinins. None of the three Indians secreted in their saliva A, B, H, or Le^b substances, but they secreted Le^a substance.

A further example of a human anti-H serum, "Warboys," has been encountered which differs in some of its properties from the Indian sera and anti-H sera of animal origin (Watkins 1952, Crumpton and Morgan 1953). The serum "Warboys" came from a group-B donor who did not secrete B or H substances in her saliva.

Serum "Tomlinson"

Recently an anti-H serum has become available to us which is considerably more powerful in its action on group-O cells than are the Indian sera. This serum was obtained from a woman, Mrs. Tomlinson, with carcinoma. The patient's blood-groups were A_1, Le (a—b—), CDe/cde, MNS, P+, Lu (a—), K—, and Fy (a+). Her red cells were not agglutinated by natural anti-H eel serum (Jonsson 1944), by immune anti-H serum prepared by the injection of rabbits with ovarian-cyst H-substance (Morgan and Waddell 1945), by natural cattle serum (Schiff 1927), by anti-H serum prepared by immunisation of chickens with *Shigella shigæ* (Grubb 1949), or by anti-O sera.

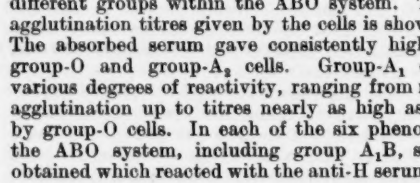
Treatment of the washed cells with saline at 56°C, however, yielded an eluate which agglutinated group-O cells to a titre of 1 in 64. It therefore seems that, although unagglutinated suspensions of Tomlinson's cells could be prepared in cold saline, they were nevertheless coated with a group-O cell-agglutinin which could be removed by washing with warm saline. The cells remaining after the antibody had been eluted were not agglutinated by either anti-O or anti-H sera.

Mrs. Tomlinson's saliva contained A substance, measured in inhibition tests against human anti-A serum, and H substance, measured against rabbit, eel, and cattle anti-H sera and human anti-H serum obtained from one of the Indians. Her saliva inhibited her own serum; unfortunately she died before a second sample of saliva could be obtained to confirm these findings. It was impossible to obtain blood and saliva specimens from any other members of her family.

The serum "Tomlinson" was titrated against the red cells of 65 group-O English people selected to include Le (a—b+), Le (a+b—), and Le (a—b—) cells. All the bloods reacted strongly and gave agglutination titres ranging from 1 in 8192 to 1 in 32,768 at 25°C. The agglutination end-points were unchanged at 13°C and were lowered by only one or two tubes when the tests were made at 37°C. Absorption of the serum with either OLe (a+b—) or OLe (a—b+) cells removed completely the agglutinin reactive with all group-O cells. Agglutination of group-O cells by the serum "Tomlinson" was inhibited by saliva from group-O secretors, by purified H substance obtained from ovarian-cyst fluids (Annison and Morgan 1952), by hog H substance, and by meconium from group-O secretor babies. The serum was thus anti-H. The human anti-H serum "Warboys" was inhibited by meconium samples from babies who did not secrete A, B, or H substance in their saliva (Watkins 1952); the serum "Tomlinson," in common with the anti-H sera obtained from the Indians, was not neutralised by meconium from babies of the "non secretor" type.

A further point in which the serum "Tomlinson" behaved like the Indian anti-H sera and unlike "Warboys" was that it reacted with group-O cells from the newborn almost as strongly as with group-O cells from adults, whereas "Warboys" did not agglutinate cord-blood erythrocytes.

A sample of the serum "Tomlinson" was absorbed with A_1B Le (a—b+) cells until there was no further reaction with the absorbing cells. The absorbed serum was then titrated against 108 bloods belonging to different groups within the ABO system. The range of agglutination titres given by the cells is shown in table I. The absorbed serum gave consistently high titres with group-O and group-A_2 cells. Group-A_1 cells showed various degrees of reactivity, ranging from no detectable agglutination up to titres nearly as high as those given by group-O cells. In each of the six phenotypes within the ABO system, including group A_1B, samples were obtained which reacted with the anti-H serum; reactivity with the serum does not therefore strictly depend on the ABO phenotype of the red cells, although it is evident that the ABO character has an influence on the degree of reactivity.



Agglutination titres with unabsorbed serum "Tomlinson" given by group-A_1 cells from 112 people.

The serum "Tomlinson" came from a group-A_1 donor and was therefore free from anti-A or anti-A_1 agglu-

TABLE II—REACTIVITY OF GROUP-A_1 CELLS WITH UNABSORBED SERUM "TOMLINSON" AT 21°C

Group-A_1 donor	Genotype	Agglutination test: Dilution of serum "Tomlinson"												
		1/2	1/4	1/8	1/16	1/32	1/64	1/128	1/256	1/512	1/1024	1/2048	1/4096	1/8192
T.H.	A_1A_1	3	3	3	3	3	2	1	tr	0	0	0	0	0
P.W.	A_1A_1	3	3	3	2	2	2	1	0	0	0	0	0	0
E.I.	A_1O	4	4	3	3	3	3	3	3	2	2	2	1	0
J.O'D.	A_1O	3	2	2	1	0	0	0	0	0	0	0	0	0
J.W.	A_1O	4	4	4	3	3	3	3	2	2	1	0	0	0
P.P.	..	1	tr	0	0	0	0	0	0	0	0	0	0	0

tr, trace of agglutination; 1, groups of 2–3 cells; 2, larger groups with many free cells; 3, agglutination visible to the naked eye; 4, massive agglutination.

tinins and could be used to test the H-reactivity of group-A_1 cells without prior absorption or neutralisation of the serum; group-A_1 cells from one hundred and twelve people were titrated against the unabsorbed anti-H serum. Included in the samples were specimens from two unrelated group-A_1 donors who were of authentic genotype A_1A_1; both parents of each donor belonged to group A_1B. Authentic heterozygous group-A_1O cells from three donors were also included in the test. The titres obtained with the hundred and twelve samples are shown in the accompanying figure, and the results of titration of six specimens of group-A_1 cells are given in table II. The genotype of the donor (P.P. in table) whose cells reacted most weakly with the serum "Tomlinson" is unknown. The known homozygous group-A_1A_1 cells gave strong reactions at 21°C, whereas one of the heterozygous group-A_1O specimens (J.O'D. in table) showed considerably less reactivity. Since in a hundred and twelve group-A_1 bloods one would expect about fifteen of the genotype A_1A_1, many such bloods must be reacting more strongly than a known specimen of group-A_1O cells. The capacity of the cells to be agglutinated by the anti-H serum is therefore clearly not related to their homozygous A_1A_1 or heterozygous A_1O nature. Titration of serum "Tomlinson" with the weakly reacting cells from donor P.P. in albumin, or treatment with trypsin, did not increase the reactivity. Agglutination of the homozygous group-A_1A_1 cells could be inhibited by purified human H substance and was therefore due to the anti-H agglutinin in the serum and not to some other antibody. Further, the elution at 56°C of antibody absorbed at 0°C on to group-A_1A_1 cells from the serum "Tomlinson" gave an agglutinin which behaved qualitatively like the original serum.

One hundred samples of group-B cells were tested against a 1 in 5 dilution of serum "Tomlinson" after neutralisation of the β agglutinin in the serum with human B substance free from H activity. Only one specimen did not produce visual agglutination at this dilution. Titrated against the anti-H serum this sample gave a titre of 1 in 4.

Red cells from the Indian donor Z (Bhende et al. 1952) were not agglutinated by undiluted serum "Tomlinson" at 12°, 20°, or 37°C. Agglutination with the group-A_1 cells (P.P.), which reacted weakly at room-temperature, disappeared at 37°C but was intensified at 12°C. The cells from the Indian donor were therefore the only ones, among those tested, which appeared to be completely devoid of H activity.

The serum "Tomlinson" was not inhibited by the individual sugar components (2%) (L-fucose, D-galactose, N-acetylglucosamine, and N-acetylgalactosamine) of the human H substance as are certain other anti-H agglutinins (Watkins and Morgan 1952, Morgan and Watkins 1953).

Discussion

The group-O cell-agglutinin described here presents some unique features. It is by far the most powerful human anti-H serum that has so far been found and shows a greater range of reactivity against cells belonging to groups other than O than is shown by animal anti-H sera. The agglutination given by homozygous group-A_1A_1 cells, and the weak reactivity shown with a sample of known heterozygous group-A_1O cells, leave no doubt that this powerful agglutinin is not detecting the product of the *O* gene despite its preferential reaction with group-O cells. Tanaka (1952) also concluded that the capacity of an anti-H serum (eel serum) to react with red cells did not depend on the presence on the cells of the product of the *O* allele. Another unusual feature is that the donor of the serum "Tomlinson" was a secretor of A and H substances; this finding is at variance with the suggestion of Sanger (1952) that anti-H and anti-O may be antibodies of the same general specificity, the former occurring in non-secretor persons. The possibility cannot be excluded, however, that the development of the antibody in this instance might be an immune response in some way connected with the patient's carcinoma.

The genetical relationship of H character to the ABO blood-groups is not yet clear. The serum "Tomlinson" will provide a most useful reagent for further investigations on the distribution and nature of the H-specific material on erythrocytes and in secretions.

Summary

A powerful group-O cell-agglutinin of human origin is described.

Its behaviour in inhibition tests with the water-soluble blood-group substances in saliva and purified H substance showed that it is an anti-H agglutinin.

The antibody reacts with authentic group-A_1A_1 cells more strongly than with a sample of known group-A_1O cells.

These results confirm that anti-H agglutinin does not detect a product of Bernstein's *O* gene, and that within the ABO system the homozygous (AA,BB) or heterozygous (AO,BO) nature of the cells cannot be determined by anti-H reagents.

We wish to thank Dr. Dorothy Parkin, of the Medical Research Council Blood Group Reference Laboratory, Dr. Adrian Slade, and the laboratory staff of the County Hospital, York, for allowing us to investigate this serum; and Dr. R. R. Race, F.R.S., and Dr. Ruth Sanger for advice and comments.

REFERENCES

Annison, E. F., Morgan, W. T. J. (1952) *Biochem. J.* **52**, 247.
Bhende, Y. M., Deshpande, C. K., Bhatia, H. M., Sanger, R., Race, R. R., Morgan, W. T. J., Watkins, W. M. (1952) *Lancet*, i, 903.
Crumpton, M. J., Morgan, W. T. J. (1953) *Biochem. J.* **54**, xxxii.
Grubb, R. (1949) *Acta path. microbiol. scand.* suppl. 84, p. 50.
Jonsson, B. (1944) *Ibid*, suppl. 54, p. 456.
Morgan, W. T. J., Waddell, M. B. R. (1945) *Brit. J. exp. Path.* **26**, 387.
— Watkins, W. M. (1948) *Ibid*, **29**, 159.
— — (1953) *Ibid*, **34**, 94.
Sanger, R. (1952) *Nature, Lond.* **170**, 78.
Schiff, F. (1927) *Klin. Wschr.* **6**, 303.
Tanaka, K. (1952) *Kyushu Mem. Med. Sci.* **3**, 103.
Watkins, W. M. (1952) *Brit. J. exp. Path.* **33**, 244.
— Morgan, W. T. J. (1952) *Nature, Lond.* **169**, 825.

ADDISON'S DISEASE WITH DIABETES MELLITUS

A CASE TREATED WITH CORTISONE

IAN MCLEAN BAIRD
M.B. St. And., M.R.C.P.
SENIOR MEDICAL REGISTRAR, ROYAL INFIRMARY, SHEFFIELD

DONALD S. MUNRO
M.B. Aberd., M.R.C.P.
LECTURER IN THERAPEUTICS IN THE UNIVERSITY OF SHEFFIELD

THE coexistence of Addison's disease and diabetes mellitus is rare. Unverricht (1926) first described a case of diabetes in which the insulin requirements decreased rapidly with the development of Addison's disease. Soffer (1948) found only fourteen authentic cases published. In eight of these Addison's disease developed after the diabetes, in four the diseases appeared simultaneously, and in only two did Addison's disease precede diabetes.

A constant feature of cases of Addison's disease with diabetes mellitus is their extreme instability (Crampton et al. 1949). They are especially liable to develop hypoglycæmic attacks, which may cause death, as in the case described by Rhind and Wilson (1941).

The present case is an instance of diabetes mellitus in which the insulin requirements decreased considerably as Addison's disease developed. Treatment with cortisone, in addition to producing a striking improvement in the symptoms of Addison's disease, has increased the daily insulin requirements to near their former level and has greatly improved control of the diabetes.

Case-history

A housewife, now aged 42, enjoyed good health until the age of 23, when she developed diabetes and was stabilised on diet and 60 units of soluble insulin daily. Although she had a stillbirth at the age of 28, she later had two normal pregnancies at 34 and 38. Her mother and her twin sister both have diabetes mellitus. She remained well until her last pregnancy, when a gradual reduction in insulin dosage became necessary because of frequent nocturnal hypoglycæmic attacks. In a year the dosage decreased from 60 to 24 units of soluble insulin daily. Pigmentation of the skin, which developed during pregnancy, did not clear after delivery, and in the following two years the patient became progressively less energetic, her weight fell, and her appetite steadily decreased. She had occasional prostrating bouts of vomiting, sometimes associated with diarrhœa. In spite of continued reduction in insulin dosage the hypoglycæmic attacks persisted and the pigmentation deepened. A patch of intra-oral pigmentation developed.

On admission to hospital in July, 1952, physical examination revealed much wasting and extensive cutaneous and buccal pigmentation. The blood-pressure was 80/60 mm. Hg.

Investigations.—The serum-sodium level was 130 m.eq. per litre, serum-potassium level 5·3 m.eq. per litre, and fasting blood-sugar level 160–450 mg. per 100 ml. The urinary excretion of 17-ketosteroids in twenty-four hours was 1·5 mg. A blood-count showed Hb 86%, red cells 4,200,000 per c.mm., white cells 5000 per c.mm. (polymorphs 65%, eosinophils 2%, lymphocytes 26%, monocytes 7%). Radiographs of chest and abdomen were normal. Electrocardiography showed low voltage in leads I and a VL; flat T waves in leads I, II, III, a VL, a VF, V_4, V_5, and V_6; inverted T waves in V_1, V_2, and V_3; and prolongation of the S–T interval. The erythrocyte-sedimentation rate was 5 mm. in 1 hr. (Westergren). A Kepler test was abandoned because the patient could not drink the requisite volume of water without vomiting.

Treatment with added salt, injections of crude cortical extract, and deoxycortone acetate somewhat improved her general condition; but, as this was still poor, she was given oral cortisone acetate 25 mg. daily. After the second dose her urine became heavily loaded with sugar and ketone bodies. Since nausea, vomiting, and progressive drowsiness ensued, it was evident that she was on the verge of diabetic coma, and only with difficulty was her diabetes again brought under control. After this the cortisone was withheld and 100 mg. of deoxycortone acetate implanted subcutaneously. With this treatment, the addition of 6 g. of salt to her diet each day, and restabilisation of her diabetes on 6 units of soluble insulin daily she improved slightly. After discharge she soon deteriorated once more, and her weight fell to 5 st. 4 lb. over the next year, a loss of 2 st. 10 lb. She had almost complete anorexia and was apathetic and depressed. It was felt that she was unlikely to survive many months.

Readmission to hospital was arranged in August, 1953. The signs of Addison's disease were unchanged, and her general condition was much worse. The investigations were repeated with similar results, except that the electrocardiographic abnormalities were more extensive (fig. 1*a*). The glucose-tolerance test is discussed below.

Treatment.—It was decided that a second attempt to introduce cortisone therapy must be made, starting cautiously with only 5 mg. daily. Accordingly this dose was started on Sept. 7, 1953. There was an immediate increase in insulin requirements from 6 to 16 units daily. By three-hourly urine testing and frequent blood-sugar estimations it was possible to make adjustments in insulin therapy promptly. Once the diabetes was stabilised, the dose of cortisone was increased to 10 mg. daily, whereupon more insulin was required. There-

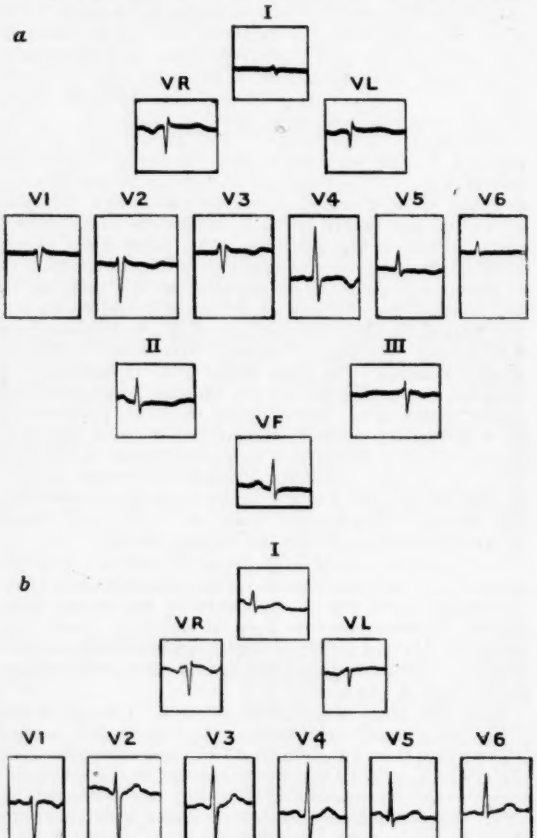


Fig. 1—Electrocardiographic changes produced by cortisone: *a*, a week before starting cortisone therapy; *b*, after two months' treatment with cortisone.

after cortisone was increased to 12·5 and finally to 25 mg. daily, by which time the insulin dose had risen to 48 units a day. These effects are illustrated in fig. 2. During this period there was a striking improvement in the patient: her apathy vanished, she regained her appetite, her general energy increased, and her weight increased.

Follow-up.—After five weeks in hospital she has been at home for three months, making steady progress while doing her own housework and caring for her two children. The improvement can be well seen in the two photographs (fig. 3). She weighs 7 st. 6 lb., her blood-pressure is 110/60 mm. Hg, her fasting blood-sugar level is 100–140 mg. per 100 ml., and her electrocardiograms have reverted to normal (fig. 1*b*).

Comparison of Diabetogenic Properties

This patient presented a rare opportunity for attempting a comparison between the diabetogenic powers of cortisone and of hydrocortisone. Oral cortisone is fully effective in four hours; therefore blood-sugar curves obtained from glucose-tolerance tests done at this interval after doses of either cortisone or hydrocortisone could be compared with control tests.

Because of the profound disturbance of carbohydrate metabolism resulting from small doses of these substances we could not administer increasing doses interspersed with days on which they were omitted for control tests,

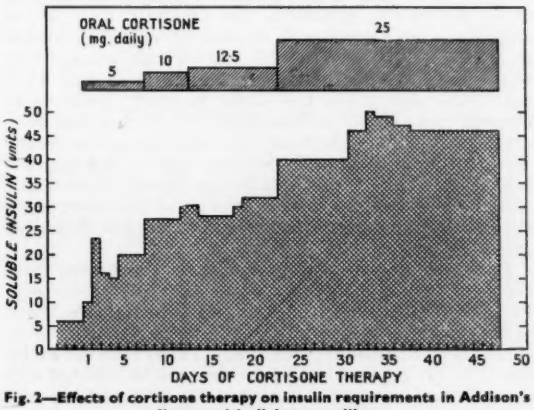


Fig. 2—Effects of cortisone therapy on insulin requirements in Addison's disease with diabetes mellitus.

because this would have made control of the diabetes mellitus impossible.

For these reasons the following procedure was adopted:

(1) Control glucose-tolerance tests were made in duplicate before treatment was started. The results are shown in fig. 4*a*.

(2) A glucose-tolerance test was repeated four hours after oral administration of cortisone 5 mg. This was compared with the effect of hydrocortisone 5 mg. given next day. The result is shown in fig. 4*b*. It will be seen that the curve ran at a higher level after hydrocortisone.

(3) Once cortisone therapy was started with 5 mg. daily and the necessary adjustments in insulin dose were made, the dose of cortisone was raised to 10 mg. On the first day of the new dose a glucose-tolerance test was done, and a second test was done next day four hours after 10 mg. of hydrocortisone; cortisone

a *b*

Fig. 3—Patient: *a*, before cortisone therapy; *b*, after three months' cortisone therapy, showing striking improvement in her general condition.

was omitted on this day. This gave a pair of curves contrasting the effect of 10 mg. of both substances (fig. 4*c*).

(4) Finally, when the time came to raise the dose to cortisone 25 mg. daily, a fourth pair of glucose-tolerance tests were completed, the first test after hydrocortisone 25 mg. (given instead of cortisone 25 mg.) and the second after cortisone 25 mg. (fig. 4*d*).

In this way pairs of curves were obtained on successive days, contrasting the effects of 5, 10, and 25 mg. of both drugs, and these could be compared with the tests before treatment. Cortisone preceded hydrocortisone in the first two dosages; the reverse order was used in the third. The effects are illustrated in fig. 4. Hydrocortisone seems to be more diabetogenic than cortisone, apart from the last pair of curves in which there is little difference between the two; by this time the patient was already maintained on cortisone 12·5 mg. daily, and extreme sensitivity to these hormones had been lost. The blood-sugar estimations were done by the method of Hagedorn and Jensen.

Discussion

The alterations in carbohydrate metabolism that take place when a patient with diabetes develops Addison's disease have been described by Crampton et al. (1949). In Addison's disease there are a low fasting blood-sugar level, hypersensitivity to insulin, and defective storage of glycogen (Allott 1953). These effects, which are reversed by cortisone, accounted for the decrease in insulin requirements of our patient and for the abrupt increase on starting cortisone. After this second successful introduction of cortisone therapy it can be seen that the administration of cortisone 25 mg. would create an

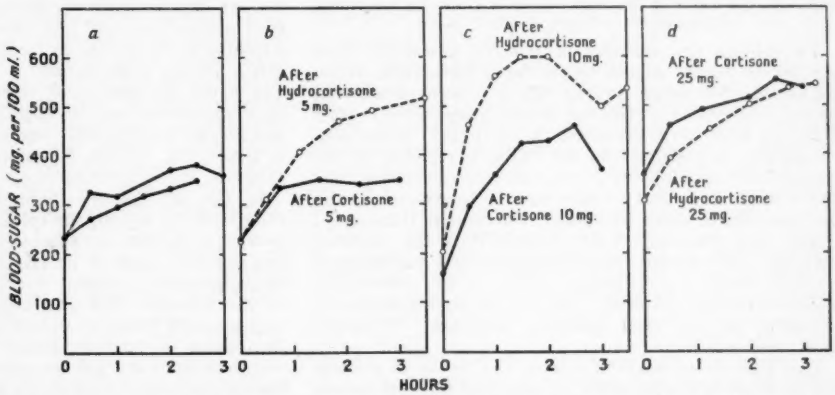


Fig. 4—Glucose-tolerance tests after 50 g. of glucose given by mouth at 0 hours: *a*, two tests without previous administration of hormone; *b*, after cortisone 5 mg. and after hydrocortisone 5 mg.; *c*, after cortisone 10 mg. and after hydrocortisone 10 mg.; *d*, after cortisone 25 mg. and after hydrocortisone 25 mg.

urgent need for large additional doses of insulin, and this adequately explains the rapid development of diabetic ketosis when cortisone was given in 1952.

These events closely resemble those reported by Simpson (1953) in a similar patient, in whom diabetic precoma resulted from the administration of cortisone 25 mg. daily for three days. This patient was stabilised on cortisone 12·5 mg. daily after the daily insulin needs had increased from 12 to 74 units.

Thorn et al. (1951) describe two cases treated with cortisone by subcutaneous implantation, later supplemented by oral cortisone, but no comment is made on the rate at which insulin requirements increased. The return of the electrocardiograms to normal after cortisone therapy agrees with the observations of Somerville et al. (1951).

Summary

A case of coexistent diabetes mellitus and Addison's disease is described. As the Addison's disease developed, the insulin requirements decreased. Cortisone therapy initially precipitated diabetic ketosis, but later a more cautious introduction of cortisone was successful. Clinical improvement ensued although insulin requirements increased abruptly. A tendency to develop frequent hypoglycæmic attacks was eliminated.

Experiments were made to compare the diabetogenic properties of cortisone and hydrocortisone.

We wish to thank Dr. H. P. Brody and Prof. E. J. Wayne for permission to publish this case and for their helpful advice, and Mr. Ernest Salvin for the blood-sugar estimations. Part of the expenses were defrayed by a grant from the Tuberculosis Research Fund of the University of Sheffield.

REFERENCES

Allott, E. N. (1953) *Proc. R. Soc. Med.* **46**, 571.
Crampton, J. H., Scudder, S. T., Davis, C. D. (1949) *J. clin. Endocrin.* **9**, 245.
Rhind, E. G. G., Wilson, A. (1941) *Lancet*, ii, 37.
Simpson, S. L. (1953) *Proc. R. Soc. Med.* **46**, 566.
Soffer, L. J. (1948) Diseases of the Adrenals. 2nd ed., London.
Somerville, W., Levine, H. D., Thorn, G. W. (1951) *Medicine, Baltimore*, **30**, 43.
Thorn, G. W., Forsham, P. H., Frawley, T. F., Wilson, D. L., Renold, A. E., Fredrickson, D. S., Jenkins, D. (1951) *Amer. J. Med.* **10**, 595.
Unverricht (1926) *Disch. med. Wschr.* **52**, 1298.

TRANSFERENCE OF PASSIVE IMMUNITY FROM MOTHER TO YOUNG

F. W. ROGERS BRAMBELL, D.Sc. Lond., F.R.S.
JOAN BRIERLEY, B. Sc. Wales
RONALD HALLIDAY, B.Sc. Wales
W. A. HEMMINGS, B.A. Oxfd

From the Agricultural Research Council's Unit of Embryology, University College of North Wales

IN rabbits the transfer of passive immunity from mother to young occurs before birth (Brambell, Hemmings, and Henderson 1951b). There is no evidence that in this species any further transference occurs after birth, by way of the colostrum or the milk. It has been shown that transference in the rabbit is effected by the passage of antibodies from the maternal circulation into the uterine lumen and by their uptake from there by the yolk-sac of the fœtus (Brambell, Hemmings, Henderson, Parry, and Rowlands 1949). Thus it is the inverted yolk-sac wall, covered with entoderm and vascularised by the vitelline circulation, which is the absorptive organ in the fœtal rabbit, and not the allanto-chorionic placenta, as had been assumed previously (Brambell et al. 1951b).

The passage of antibodies into the fœtus in rabbits can be studied conveniently by injecting immune serum directly into the uterine lumen, thereby avoiding complication due to passage from the maternal circulation to the uterine lumen (Brambell et al. 1949). The inverted yolk-sac wall and the chorion, forming a wide annular zone, which is non-vascular, between the margin of the yolk-sac and the circumference of the placenta, are exposed to the immune serum in this way. The use of a mixture of immune sera, prepared in two or more species against a different antigen in each case, permits of direct comparison of the absorption of the different antibodies (Brambell, Hemmings, Henderson, and Rowlands 1950; Brambell, Hemmings, Henderson, and Oakley 1952). It was shown by this means that antibodies prepared in rabbits were absorbed by the yolk-sac wall and appeared in the fœtal circulation much more readily than those prepared in cattle or horses (Brambell et al. 1952). Further work (as yet unpublished), in collaboration with Prof. C. L. Oakley and Mrs. I. Batty, has shown that antitoxins prepared in man, guineapig, and dog form a series in that order intermediate between those prepared in rabbits on the one hand, and in horses and cows on the other hand, in reference to the ease with which they are absorbed into the fœtal circulation. Thus absorption by the yolk-sac is a selective process distinguishing between antibodies prepared in different species.

Antibodies from immune sera injected into the uterine lumen in pregnant rabbits also appear in the amniotic fluid of the fœtus, having traversed presumably the non-vascular chorion and the amnion. Passage of antibodies from the uterine lumen to the amniotic fluid is not selective with reference to species of origin (Brambell et al. 1952). It differs in this respect from passage into the fœtal circulation. Once within the amniotic fluid, antibodies can reach the fœtal stomach, presumably through the gulping movements of the fœtus, and may attain very high concentrations in the stomach contents. Nevertheless antibodies do not pass from the gut contents into the fœtal circulation in rabbits in detectable amounts, whether they are prepared in rabbits or in other species (Brambell, Hemmings, Henderson, Oakley, and Rowlands 1951a).

It is well known that immunity is transferred from the fowl to the chick by way of the yolk of the egg. Passage of antibodies from the yolk into the circulation of the chick takes place during the later part of incubation (Brandly et al. 1946, Buxton 1952). It has been shown by one of us (J. B.) that immune serum can be injected into the yolk-sac on the 6th to 8th days of incubation and immediately after hatching and that antibodies from the serum can be absorbed into the circulation. Antibodies from immune serum prepared in fowl are absorbed readily, but those from sera prepared in rabbits, horses, or cows could not be detected in the circulation of the chick. Antibodies from serum prepared in pigeons were absorbed into the circulation in significant amounts, but less readily than those of immune fowl serum. Although the one-day-old chick can absorb antibodies from immune fowl serum injected into the retracted yolk-sac after hatching it cannot do so from the same serum administered orally, even before it has commenced to feed. The newly hatched chick resembles the fœtal rabbit in that antibodies can be absorbed by the yolk-sac wall, but not by the gut wall, and absorption by the yolk-sac is a selective process distinguishing between antibodies prepared in different species.

In the rat, passive immunity is transferred mainly after birth by way of the colostrum and the milk. Moreover, transference continues for 20 days of lactation in this species. One of us (R. H.) has shown that when immune serum prepared in rats is administered by tube to the stomach the antibodies pass rapidly into the circulation of young rats at all ages from birth to 20 days. Antibodies of immune serum prepared in rabbits are absorbed from the gut into the circulation also, at least during the first 10 days of life, but much less readily than those from immune rat serum. Antibodies of immune sera prepared in cows or in fowl do not enter the circulation by this route in quantities that can be detected. Thus absorption of antibodies from the gut of the young

rat is selective, as is the absorption by the yolk-sac in the fœtal rabbit or the chick.

In man transfer of passive immunity is known to take place mainly, or more probably entirely, before birth. The route is unknown, so far as we are aware. It has been assumed, though without evidence, to be by way of the allanto-chorionic placenta. This assumption is not justified any longer, in view of the discoveries outlined above concerning the route of transference in the rabbit. Yet the structure and arrangement of the embryonic membranes in man is entirely different from that in the rabbit. Transmission by way of the yolk-sac appears impossible, since this organ is rudimentary and is isolated from the periphery of the conceptus. Hence transference in man must take place by some other route than in the rabbit (Brambell, Hemmings, and Rowlands 1947). The late human conceptus is bounded by the placenta (chorion frondosum) and by the chorion læve, consisting of the chorion to which, over almost its entire extent, the amnion is fused. Transmission of antibodies from the maternal circulation could occur either through the placenta directly into the fœtal circulation, or by way of the chorion læve into the amniotic fluid and thence by swallowing to the fœtal gut. The former route appears at first sight to be the more obvious, but we know of no evidence to support it. Regarding the latter route we know that transfer is by way of the uterine lumen, not the placenta, in the rabbit (Brambell et al. 1949); that antibodies do pass into the amniotic fluid; that these are concentrated in the stomach contents of the rabbit fœtus; and that antibodies are absorbed in quantity from the gut contents of newborn ruminants, horses, pigs, dogs, mice, and rats (Brambell et al. 1951b). It would be in keeping with our knowledge of other animals that the route in man should be via the chorion læve, amniotic fluid, and fœtal gut.

There is evidence that the absorption of antibody by the fœtus in man is a selective process. Although the titre of the cord-blood of a newborn baby usually approximates to that of the blood of the mother, when she has been actively immunised, often equalling or even exceeding it, Hartley (1951) quotes two cases in which refined diphtheria antitoxin prepared from horse-serum did not pass from the maternal to the fœtal circulation in significant amounts. Further, there is evidence that in hæmolytic disease incomplete anti-D antibody reaches the fœtus more readily than complete antibody (Pickles 1949). The selective absorption described above in the rabbit, fowl, and rat is mediated by an entodermal surface in each case, whether yolk-sac or gut wall. Absorption is selective in the guineapig also (Hartley 1951), but the arrangement of the fœtal membranes in this animal is so similar to that in the rabbit that there is no reason to believe that the route of transference is different. It seems probable, if absorption is selective in man, that it occurs through an entodermal surface also and that the initial passage through the chorion læve into the amniotic fluid is not selective. Concentration of antibody from the amniotic fluid in the stomach might occur, as in the fœtal rabbit near full term (Brambell et al. 1951a). Should this be so, a considerable reservoir of antibody might be built up in the stomach contents, from which it might be absorbed into the circulation.

REFERENCES

Brambell, F. W. R., Hemmings, W. A., Rowlands, W. T. (1947) *Lancet*, ii, 759.
— — Henderson, M., Parry, H. J., Rowlands, W. T. (1949) *Proc. Roy. Soc.* B. **136**, 131.
— — — Rowlands, W. T. (1950) *Ibid*, **137**, 239.
— — — Oakley, C. L., Rowlands, W. T. (1951a) *Ibid*, **138**, 195.
— — — (1951b) Antibodies and Embryos. London.
— — — Oakley, C. L. (1952) *Proc. Roy. Soc.* B. **139**, 567.
Brandly, C. A., Moses, H. E., Jungherr, E. L. (1946) *Amer. J. vet. Res.* **7**, 333.
Buxton, A. (1952) *J. gen. Microbiol.* **7**, 268.
Hartley, P. (1951) *Proc. Roy. Soc.* B. **138**, 499.
Pickles, M. M. (1949) Hæmolytic Disease of the Newborn. Oxford.

Medical Societies

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

THE society's 74th annual congress was held on April 22–24 in Newcastle upon Tyne, under the presidency of Mr. ALEXANDER MACRAE. At the opening session, the Nettleship medal was presented to Dr. NORMAN ASHTON, director of pathology at the Institute of Ophthalmology, in recognition of his contributions to ophthalmology.

In the discussion on inflammatory vascular diseases affecting the eye, Mr. R. C. DAVENPORT considered in particular the condition of retinal vasculitis. He emphasised the frequent clinical association of these retinal vascular lesions with inflammation of the uveal tract; the condition was thus one that involved the major structures in the eye rather than a local vascular derangement. Dr. S. P. MEADOWS dealt with temporal arteritis. He had been impressed by how phlegmatic these patients were when confronted with sudden total blindness, an attitude which suggested that there was an associated general nervous degeneration. Other speakers confirmed this observation. Prof. J. B. DUGUID presented evidence to show that arterial occlusion was the underlying factor in various forms of acute arteritis.

Discussing the diagnosis of orbital tumours, Mr. GEORGE BLACK emphasised the value of radiography after air injection into the orbit. He preferred transfrontal exploration rather than anterior biopsy when the tumour did not present anteriorly.

During the symposium dealing with the changes in the incidences of the eye affections of coalminers in the past twenty-five years, Dr. DOROTHY CAMPBELL discussed miners' nystagmus and pointed out the importance of accurate certification and of social welfare in preventing the condition. Mr. W. J. WELLWOOD FERGUSON presented statistics on the incidence and nature of ocular injuries from mining with general reference to methods of mining and methods of treatment and prevention. Dr. G. I. SCOTT drew attention to the declining incidence of hypopyon ulcers in miners during the past twenty-five years. This could be attributed particularly to the improvement of prophylactic treatment, given both as a first-aid measure at the pit-head and by the general practitioner.

A second symposium was devoted to gonioscopy after glaucoma operations. Mr. H. E. HOBBS illustrated the gonioscopic appearances after drainage operations, and assessed the clinical effects of the anatomical variants shown; and Mr. REDMOND SMITH discussed the general interpretation of broad and narrow angles and the presence of peripheral anterior synechiæ.

In a series of short demonstrations, Mr. A. SEYMOUR PHILPS explained the technique of keratography and its value in recording irregularities of the corneal curvature; Mr. A. T. G. EVANS described a case of essential atrophy of the choroid with ataxia and a strong family history of similar conditions; Mr. J. FRANKENTHAL discussed a case of a large cyst of the iris following lens extraction; Mr. P. J. L. HUNTER described an unusual case of bilateral lymphosarcoma of the orbit; Mr. E. F. KING reported two cases of secondary carcinoma of the choroid, which had shown a striking regression after adrenalectomy; and Mr. P. D. TREVOR-ROPER described a case in which symmetrical metastases from a breast carcinoma had presented in the angles of both anterior chambers, strictly confined to the horizontal axes, suggesting an anatomical vagary of the retrobulbar arteries by which the metastases were diverted into the long posterior ciliary arteries rather than the short posterior ciliary arteries.

Reviews of Books

Child Health and the State

ALAN MONCRIEFF, C.B.E., M.D., F.R.C.P., J.P., Nuffield professor of child health, University of London. London: Oxford University Press. 1953. Pp. 48. 6s.

THE publication of Professor Moncrieff's Newsholme lectures will enable many who could not hear them to read and ponder over them with profit. He describes the evolution of the many services devoted to the promotion of health and happiness in childhood, and reviews the position of the local-authority services in relation to the National Health Service. He believes that the State is still not pursuing a sufficiently energetic child-health policy, particularly for the pre-school child. Nevertheless, it is a matter for pride that Newsholme's words are still true: "In no other part of Europe has there been such wide-spread and universal organisation of special work for the infant and pre-school child as in Britain."

Professor Moncrieff also believes that the great improvement in the health of school-children in the last fifty years has not been accompanied by sufficient adjustment of the school health service to present conditions. He regrets that provision for the care and education of the maladjusted child is still inadequate, and he rightly deplores the failure to continue the reablement and training of handicapped children after they leave school. The machinery for caring for the handicapped at this crucial age is there, but it is often ignored, and he emphasises the importance of enabling the physically handicapped child to remain at home whenever possible. Some of the provisions of the enlightened Children Act of 1948 have still not been implemented, and he particularly regrets the dilatoriness in establishing temporary reception centres which would spare deprived children from facing several changes before they are settled in suitable homes. But more and more deprived children are enjoying a happy home life rather than growing up in abnormal institutional surroundings.

His emphasis on the value of a closer liaison between parents and schools, and his belief that school doctors should take more part in school activities and instruction, are sound. There will also be general agreement with his view that still more could be done to help parents to accept responsibility for home care by encouraging them to overcome their troubles by living with them instead of passing them on to someone else, and with his timely warning of the increasing danger of parents demanding as a right to have everything done for them.

Physiopathology of Cancer

Editor: FREDDIE HOMBURGER, M.D., research professor of medicine; WILLIAM H. FISHMAN, PH.D., research professor of biochemistry, Tufts College Medical School. London: Cassell. 1953. Pp. 1031. 135s.

IN his introduction to this weighty tome, Dr. C. C. Little emphasises the need to have at least a speaking acquaintance with the objectives, obstacles, and advances in all possible channels to progress. To meet this need the book not only covers research on the physiopathology of cancer, but goes much beyond its title and includes contributions from biology, chemistry, physics, clinical investigations, and practical applications. The durable value of some of the articles perhaps justifies the lavish production and high price.

Inevitably there is overlapping and even a little discord among the 28 contributors. Omissions of new work are unavoidable owing to the time-lag in publication. References extend only to 1951, with a few footnotes of later date. Recent successes in grafting heterologous tumours in the cheek pouch of the hamster, which will affect opinions on the immunological basis of grafting, are not included, nor is the reported action of cortisone in increasing metastatic growth. A more serious omission, not due to a time-lag, is a discussion of the subdivision of tumour induction into stages that have been described as initiation and promotion. This analysis of tumour genesis has practical uses as well as profound theoretical value.

But the excellence of many chapters outweighs any defects. The chapter on hormonal factors in experimental carcinogenesis may prove one of the most generally useful. The chapter on steroid metabolism gathers together widely scattered and often discrepant data.

At present our only hope of reducing the amount of human cancer is by prevention, and only precise knowledge of environmental cancer will enable us to achieve this. This is the theme of a most informative section on occupational and other environmental factors. It is supported in another section by a lucid account of the problems of collecting and interpreting data and the help that can be expected from statistical studies. Well-balanced accounts of theories of carcinogenic mechanisms, chemotherapy, and radiation therapy, and an adverse review of diagnostic tests are included. The virus theory is dealt with in lively fashion, stress being laid on known instances of non-specificity of cell infection, thus making more plausible its universal application to all morphological varieties of cancer in all classes of animals. A section on epidemiology of spontaneous virus infections in avian flocks in the U.S.A. provides new observations on the time of appearance of antibodies to the Rous sarcoma virus in young birds and on the high incidence of antiviral antibodies to three varieties of infection in older ones. This information has long been wanting on both sides of the Atlantic.

Pulmonary Tuberculosis

Pathology, Diagnosis, Management and Prevention. 3rd ed. WALTER PAGEL, M.D., pathologist, Central Middlesex Hospital; F. A. H. SIMMONDS, M.D., physician and medical director, Clare Hall Hospital; NORMAN MACDONALD, M.B., M.R.C.P.E., physician, Clare Hall Hospital. London: Oxford University Press. 1953. Pp. 728. 84s.

THE general plan of presentation in this edition of Kayne, Pagel, and O'Shaughnessy's Pulmonary Tuberculosis is the same as in the last, but so swift have been the advances in the subject during the past five years that much of it has been rewritten—notably the sections on chemotherapy and surgical management, epidemiology, prevention, and B.C.G. vaccine. Dr. Nassau has again revised his chapter on bacteriological diagnosis. Yet the book remains the same size, and contains all the important facts. The quality of the many illustrations is high.

The authors' deep insight into the disease as a whole and into its natural progress has enabled them to maintain balance between the different aspects of the subject, and has clearly steadied them in their evaluation of such modern methods of treatment as lung excision—a radical measure which has still to win its long-term spurs. On the other hand, they are perhaps too severe in their criticism of the artificial pneumothorax, and possibly too lenient towards the pneumoperitoneum which has certainly felt the impact of chemotherapy and modern surgery much more than has the artificial pneumothorax.

Viruses

Symposia on Quantitative Biology. Vol. 18. Cold Spring Harbor Biological Laboratory. 1953. Pp. 301. $8.00.

IF the textbooks contain solid fare, the Cold Spring Harbor symposia provide exotic and highly spiced dishes unsuited to tender digestions. In this instance there are 41 papers, mainly on bacteriophages, and to a lesser extent on animal viruses, and anyone who listened attentively to all 41 papers must have emerged sadder and perhaps wiser.

The papers are grouped as follows: virus in the vegetative state (i.e., in course of intracellular development) and its maturation, including recombination and multiplication cycles in bacterial and animal viruses; provirus (this is the state in which virus is assumed to exist in latent infections during which its development can be stimulated at any stage, although at the moment it cannot be identified in the provirus form); the transition from provirus to vegetative virus (both these groups of papers deal mainly with bacteriophages); structure of viruses; biochemical studies of virus infections; host-controlled variations of viruses; and, finally, the new and rapidly developing field of animal viruses in tissue culture.

This is a unique collection of essays containing a great deal of thought-provoking stuff, but it must be read in small doses, and certainly not in bed.

FAREX till five...

As soon as the infant weighs 15-lb., it is time for his introduction to Farex. Then it's Farex *every* day to take him smoothly on to "solids." But remember, this sound start to nutritional well-being is best consolidated by giving the *balanced* nourishment of Farex throughout the early, formative years—right up until schooldays.

...and watch them thrive

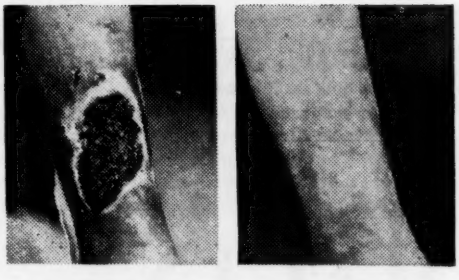
FAREX

3-CEREAL FOOD
in 10-oz. containers

Research Laboratories:
Manufacturers of medical products and foods. Agents or associate companies in almost every country in the world

GLAXO LABORATORIES LTD., GREENFORD, MIDDLESEX, ENGLAND

"F99" *in the treatment of* LEG ULCERS



CASE OF MR. B. S. Photograph on left taken 20th December, 1950, before treatment with "F99". Photograph on right taken 28th March, 1951, after 14 weeks' treatment with "F99".

"F99"—available in capsule, liquid and ointment forms—is a concentrate of the active isomers of Linoleic and Linolenic acids, of the highest achievable purity and standardized biological activity. It is indicated in skin disorders due to essential fatty acid deficiency of dietetic or "absorption" origin, i.e. chronic furunculosis, eczemas of various types, including infantile eczema, and in some cases of acne.

"F99" is also excellent in the healing of all wounds free from serious infection—particularly leg ulcers. Sufficient success has also been reported to warrant its use—as an unsaturated substance—in the treatment of psoriasis.

Literature on request

INTERNATIONAL LABORATORIES LTD. *Dept. LT*19, **205, HOOK ROAD, SURBITON, SURREY**

23

FOCUS ON Gastro-Enteritis

In the treatment of many infections of the gastro-intestinal tract, combined therapy with streptomycin and sulphaguanidine is a distinct advance on previous forms of treatment.

Guanimycin in which streptomycin sulphate is combined with sulphaguanidine is indicated for the treatment of gastro-enteritis, bacillary dysentery, summer diarrhœa, salmonella food poisoning and other mixed infections of the gastro-intestinal tract in infants, children and adults.

Guanimycin is issued as a stable dry powder from which a smooth, palatable, homogeneous suspension may be made by simple mixture with water.

GUANIMYCIN

Trade Mark

ORAL STREPTOMYCIN SULPHATE with SULPHAGUANIDINE

In bottles to prepare 4 fluid ounces.

Literature on application.

ALLEN & HANBURYS LTD LONDON E 2

TELEPHONE BISHOPSGATE 3201 (20 LINES) TELEGRAMS "GREENBURYS BETH LONDON"

THE LANCET

LONDON: SATURDAY, MAY 8, 1954

Hazards of Broad-spectrum Antibiotics

ON an earlier page of this issue Dr. HAY and Dr. MCKENZIE describe the side-effects observed in the treatment of 603 cases with oxytetracycline (terramycin). Their patients under 12 years of age received 20 mg. per kg. of body-weight daily in four equal divided doses; those aged 12 years and over were given 2 g. daily. The drug was given with abundant fluids, usually milk, and vitamin B was also administered. Despite these precautions the incidence of side-effects was 8%; and 2 of the patients died with fulminating gastro-enterocolitis associated with coagulase-positive staphylococci. This considerable and well-documented series of observations brings home to us yet again that oxytetracycline, like other broad-spectrum antibiotics, must be prescribed cautiously. Apart from the 2 instances of fatal gastro-enteritis, HAY and MCKENZIE draw attention to other important staphylococcal complications of oxytetracycline therapy: sore throat with a scarlatiniform rash (7 cases); sore throat without a rash (8 cases); balanitis with scarlatina (1 case); and urinary infection (3 cases). The untoward effects in these 21 cases commonly appeared on the fourth or fifth day after the start of treatment. Not all of these 21 patients were examined bacteriologically, but staphylococci were isolated and incriminated as the probable cause in 14 of them. Other side-effects were observed in a further 31 cases: pyrexia (24); urticaria (3); and transient erythema (4). The 24 cases in which pyrexia was the only symptom were not examined bacteriologically, but the time of onset of the pyrexia coincided so precisely with that of the proven staphylococcal cases that there is at least a strong suspicion that the same organism was involved. The reports of the cases of urticaria and erythema read like the usual accounts of skin-sensitisation to antibiotics. Other reports of complications with the broad-spectrum antibiotics, from many sources,[1–5] combine to give a picture of antibiotic-resistant staphylococci stepping in to colonise the territory from which other bacteria have been eliminated, with rapidly fatal gastro-enterocolitis as a far-from-rare result.

What are we to do about this state of affairs? Clearly we must bring ourselves to understand that oxytetracycline, aureomycin, and the combination of penicillin and streptomycin are potentially lethal. In appropriate cases their use is justified; but we have to become more certain what is an appropriate case. HAY and MCKENZIE reasonably state that broad-spectrum antibiotics should not be used for trivial and minor illnesses. Nor should they be used for routine prophylaxis against infections which are far from inevitable and would be easily controlled if they appeared. The effects observed by HAY and MCKENZIE, although serious enough to cause misgiving, are by no means as grave as some that have been reported—by TERPLAN et al.,[5] for example. One reason may have been that HAY and MCKENZIE adopted a relatively moderate scheme of dosage. FINLAND et al.[6] found, with oxytetracycline, that staphylococcal diarrhœa was about twice as common among patients who received 250 mg. every four hours or 500 mg. every four or six hours as it was among others who received only 250 mg. every six hours. They found also that administration of purgatives during antibiotic therapy tended to precipitate staphylococcal enteritis. In the treatment of urinary infections GOULD et al.[7] showed that remarkably small doses of antibiotics not only brought about cure but prevented the appearance of resistant organisms. Possibly our attitude to dosage of antibiotics is governed too much by a warlike feeling that we must drive the offending organisms from their hold on the tissues before they can grow accustomed to our weapons and produce a resistant strain; no doubt a right fear of inadequate dosage is partly responsible for the prevailing tendency to give more drug than is either necessary or safe. Our approach possibly lacks subtlety. Bacteria have almost infinite powers of adaptation,[8] but there is some experimental evidence that by swiftly eliminating all the sensitive organisms from a mixed population we leave the field to the resistant ones. Important recent work by SAZ and EAGLE,[9] who discuss earlier related experiments,[10–14] now clearly shows that penicillin-resistant staphylococci may be killed if grown on agar along with penicillin-sensitive staphylococci and low concentrations of penicillin. The explanation of this sensitisation phenomenon, which could be demonstrated only in a relatively narrow zone of penicillin concentrations, is not clear; and the results, which were strictly species-specific, were not easy to reproduce with regularity and could not be demonstrated at all in fluid cultures. SAZ and EAGLE wonder whether fractions released from penicillin-sensitive organisms undergoing lysis at low concentrations of penicillin may have been incorporated into the penicillin-resistant members, which were thus transformed to sensitive organisms. This interesting work should at least remind us that bacteria may respond more readily to finesse than to blasting. On every ground we have reasons for trying to find the the lowest dose of an antibiotic that will do the job required of it.

Another simple empirical measure perhaps deserves more attention than it has received. MANHEIM[15] gave *Lactobacillus acidophilus* or buttermilk for anorectal complications due to antibiotics, and WILLCOX[16] used yogurt for the same purpose. POLYMENAKOS[17] now reports that the result of giving

1. Kramer, I. R. H. *Lancet*, 1948, ii, 646.
2. Gardner, D. L. *Ibid*, 1953, ii, 1236.
3. See *Ibid*, p. 1245.
4. Goiffon, R., Goiffon, B. *Pr. méd.* 1954, **62**, 488.
5. Terplan, K., Paine, J. R., Sheffer, J., Egan, R., Lansky, H. *Gastroenterology*, 1953, **24**, 476.
6. Finland, M., Grigsby, M. E., Haight, T. H. *Arch. intern. Med.* 1954, **93**, 23.
7. Gould, J. C., Bowie, J. H., Cameron, J. D. S. *Lancet*, 1953, i, 361.
8. Adaptation in Micro-organisms: Third Symposium of the Society for General Microbiology. Edited by E. F. Gale and R. Davies. London, 1953.
9. Saz, A. K., Eagle, H. *J. Bact.* 1953, **66**, 347.
10. Voureka, A. *Lancet*, 1948, i, 62; *J. gen. Microbiol.* 1952, **6**, 352.
11. Winner, H. I. *Lancet*, 1948, i, 674.
12. George, M., Pandalai, K. M. *Ibid*, 1949, i, 955.
13. Barber, M. *Ibid*, 1948, i, 730.
14. Bennison, W. H., Schwabacher, H. *Ibid*, p. 885.
15. Manheim, S. D. *N.Y. St. J. Med.* 1951, **51**, 2759.
16. Willcox, R. R. *Lancet*, 1951, ii, 154.
17. Polymenakos, L. G. *Ibid*, April 3, 1954, p. 732.

three or four cups daily of yogurt along with broad-spectrum antibiotics is excellent from the point of view of reducing nausea, diarrhœa, and burning in the anorectal region. Lactobacilli are not easily established in numbers within the intestine of normal adults eating a mixed diet, but the situation may be different when antibiotics have removed most of the normal flora of the region and the diet is mostly of milk. If lactobacilli can be established they will certainly make it hard for staphylococci to take charge. Whatever we resolve to do, we dare not continue to ignore a series of therapeutic complications which are not rare and which endanger life.

Salicylates in Rheumatic Fever

THE therapeutic value of cortisone and corticotrophin in rheumatic fever has not yet been fully analysed, but it already seems unlikely that the long-accepted reputation of salicylates will suffer much by comparison. Yet while few would deny the special analgesic and antipyretic properties of salicylates, the case for attributing to them specifically anti-rheumatic action remains unproved—at any rate with regard to carditis and its sequelæ. The recent application to rheumatic fever of hormone therapy, with the full panoply of modern methods of clinical trial, has illuminated some of the shortcomings of previous investigations of salicylates. In 1949, already aware of these inadequacies, Professor ILLINGWORTH and his colleagues initiated at Sheffield a new attempt to assess the value of salicylate treatment, and these workers have now published an interim report.[1]

Assessment is difficult in a disease such as this which runs a variable natural course, and the Sheffield group planned their study in a way which provides valid comparisons of accepted simple observations on treated and control groups. In the matter of salicylate dosage, they found real evidence from previous work of the short-term value of high dosage; and they have aimed at blood-levels of 30–40 mg. per 100 ml. The interim findings are based on investigation of 55 children—44 with first attacks and 11 with relapses. Diagnosed on admission by accepted criteria,[2] these cases were distributed without exclusion between control and salicylate groups, whose treatment was otherwise identical, including continuous antistreptococcal prophylaxis with penicillin or sulphonamides. Professor ILLINGWORTH and his colleagues were determined to let no child suffer if he was allocated to the control group and his progress was subsequently unsatisfactory, and in fact 5 cases were transferred from the control to the salicylate group during the investigation; 2 of these, in which pericarditis was present, were included in the final assessment, thus weighting the salicylate group unfavourably. The strict analysis of results shows that the patients who received large doses of salicylates daily until the erythrocyte-sedimentation rate had fallen to normal and remained so for two weeks—an average period of 65 days—fared better than those not receiving the drug. Analysis under different heads—the effect on arthritis, temperature, sleeping pulse-rate, cardiac murmurs, and erythrocyte-sedimentation rate—showed results significantly in favour of salicylates only in the effect on the fever and on the sedimentation-rate. After a relapse the speed of fall of the sedimentation-rate in both treated and control groups was distinctly slower than after a first attack; but this rate was still significantly greater in the salicylate-treated cases than in the controls; which, as the authors point out, is at variance with the idea that salicylates are of value only if given early. Other clinical comparisons showed no significant differences; but, despite the adverse weighting against the salicylate group, under each heading such differences as there were favoured salicylates. This was also true of the final clinical assessment of treated and control cases, after periods of observation averaging 31 and 32 months respectively.

This appraisal of the worth of salicylate therapy in rheumatic fever confirms, then, that patients do better with it than without it. The Sheffield study will be a useful yardstick for future clinical trials.

1. Illingworth, R. S., Burke, J., Doxiadis, S. A., Lorben, J., Philpott, M. G., Stone, D. G. H., Scott, J. F. *Quart. J. Med.* 1954, **23**, 177.
2. Jones, T. D. *J. Amer. med. Ass.* 1944, **126**, 481.

Psychiatric Evidence at Murder Trials

CRIME is social abnormality; and serious crime is often associated also with mental aberration—a defect of will and reason. On a capital charge, it is almost impossible for judge and jury to determine unaided whether or not, at the time when he committed murder, the accused was suffering from a disease of the mind. As soon as any question of this kind arises—and in many cases the very gravity of the offence will raise it—the court will need the advice, if not the guidance, of expert psychiatrists.

The execution of an insane criminal is not merely abhorrent to the community, but is actually itself a crime by the ancient tradition of the common law. Indeed, despite the absurd wording of the verdict "guilty but insane" (which was introduced into our system as late as 1883 on the personal insistence of QUEEN VICTORIA after an attempt had been made on her life), an insane person who has committed murder is not responsible in criminal law, and cannot be punished; he is *not* guilty. How best to collect the necessary data and diagnoses on the issue and present the essential medical evidence to the jury is a problem which has long caused concern, and the situation in English courts is not yet satisfactory. Clear-cut diagnosis of the exact degree and stage of mental disease, and the expression of this diagnosis in terms comprehensible to laymen, is extremely difficult, and the responsibility involved in such a matter of life and death is extremely grave; yet the position of psychiatrists in murder trials is in no way different from that of other expert witnesses in ordinary criminal or even civil proceedings.

These questions were raised (incidentally) during the deliberations of the Royal Commission on Capital Punishment[1]; but, though the commission recommended certain minor alterations in the present somewhat haphazard practice, it did not feel justified in making any far-reaching recommendations which would have repercussions beyond the limited field of its inquiry. Fortunately, however, in one of the numerous and valuable appendices to its report, the commission did assemble and publish a considerable amount of up-to-date information about the law

1. See *Lancet*, 1953, ii, 713.

and practice in these matters in foreign countries. This information suggests a definite trend towards a more scientific approach, and should help in formulating the principles that ought to govern psychiatric evidence in murder cases under any modern legal system.

In the United States, and in most Continental countries, the law not only provides for routine psychiatric examination upon arrest of anyone accused of murder, but entrusts this examination to independent psychiatric criminologists appointed either by the court (so-called court experts) or by an autonomous professional body. In France, for instance, experts will be chosen by pricking names on a roll of specialists available at each assize court, and a similar practice obtains under the German code of criminal procedure. In the United States the responsibility of the medical profession in the selection is even more direct. In the State of Massachusetts, for instance, under a law introduced in 1921, the court asks the department of mental health for a report on the mental state of the accused, while in New York State two qualified psychiatrists are usually nominated by the superintendent of a public hospital. The advantages of some such system, which does not rely on prison doctors attached to the remand prisons, are obvious even from comparison of English practice with that in Scotland, where two outside specialists are regularly called in. Psychiatrists thus selected have no connection whatever with the prosecution or the prison authorities—an important point if justice not only is to be done to the accused, but is also to be plainly seen to be done. It is the medical profession itself which, through its organisations, guarantees the independence of judgment and the medical qualifications of the experts. In these circumstances there is greater likelihood that the medical findings will be accepted by both sides, and that conflict of testimony about sanity will be avoided at the eventual hearing in court. Such a development has already been observed in Scotland, but experience in the United States is said to go even further. In Massachusetts, for example, the plea of insanity is rarely raised by the defence where the psychiatric report (obtained in the manner described above) is unambiguously negative, although the defence is fully entitled to appoint its own experts and to call upon their evidence at the trial. Such a result would certainly seem desirable in clear-cut cases. The fact that in English courts insanity is almost always pleaded as a last resort—and often on inadequate grounds—has presumably contributed not a little to the scepticism with which judges and juries nowadays view the psychiatrist.

There are other important points in favour of charging an independent medical body with the appointment of expert psychiatrists for murder trials and with preparation of the necessary report and evidence. Of these the most important perhaps is the possibility thus afforded for long and close observation. Many foreign legal systems seem to work on the assumption that at least two weeks, and possibly as much as two months, of continuous investigation may be required before the necessary case-history can be compiled and a reliable opinion can be formed. Obviously such observation is best carried out in a mental hospital, and not in an ordinary prison, although some countries, including Holland and France, have established special psychiatric observation clinics attached to certain large prisons. Because of the practical difficulties, the Royal Commission on Capital Punishment rejected for this country the idea that all prisoners charged with murder should be transferred for an initial period of observation to a mental hospital; but we trust that some alternative will eventually be found to the present system whereby examination of the prisoner is normally limited by the facilities (or lack of them) at an ordinary remand prison. Moreover, anyone familiar with the full reports of recent trials on capital charges will be aware that the prosecution often benefits from the fact that the prison doctor has had the accused under continuous observation during the period of remand, whereas outside specialists called for the defence must base their findings on short interviews. This is the more serious in view of the presumption of English law (not known to most foreign systems) that any man is sane unless the contrary is proved to the satisfaction of the jury. It is thus up to the defence to satisfy the jury that the prisoner was so insane as not to be responsible for his actions. In at least one recent murder trial the accused was convicted although the only medical witness who gave evidence at the hearing declared him to be suffering from a serious mental disease.

It is generally felt today that it would be highly undesirable to deprive the judiciary of the final decision on whether or not the accused was so insane at the time of his crime as not to be responsible in the eyes of the law. That this is a legal, not a medical, question is now recognised in all countries. Nevertheless, experience in this country, and the law and practice abroad, should make it possible to devise measures to ensure more reliability—and consequently greater persuasive weight in the courts—for psychiatric reports and evidence. These might be summarised as follows:

(1) Obligatory and compulsory examination before trial of every prisoner charged with murder, by at least two psychiatrists whose professional qualifications and experience are of a high order.
(2) Independence of the expert judgments and opinions to be assured by special methods of selection and appointment of the psychiatrists.
(3) All expert reports and testimony to be based on lengthy and continuous observation and investigation.
(4) At the trial, strictly scientific, and as far as possible non-controversial, presentation of the evidence on the issue of sanity.

Though there would still be honest differences of expert opinion, testimony of independent psychiatrists, reporting after adequate observation, and freed from some of the less agreeable aspects of hostile cross-examination at the trial, should help to bridge the present gap between the law and medicine on the complex issues involved. True enough, even the present system in this country avoids on the whole the suspicion that insane persons have been, or are likely to be, made to suffer the extreme penalty of the law. It does so by means of the Home Secretary's inquiries, under the Criminal Lunatics Act of 1884, *after* sentence of death has been passed. But it is not easy to avoid the impression that the very necessity for such a last-minute inquiry

(except in the rare cases where a prisoner has become insane since conviction), and the spectacle of so many death sentences pronounced but never carried into effect, are in themselves a sure sign that all is not well with the law as it stands. It may have something to learn from the practice of other countries.

Annotations

A SURGICAL OCCASION

As we have already announced, the American College of Surgeons is, for the first time, holding one of its sectional meetings in England, and the proceedings which will open at the Royal College of Surgeons on May 17, with Sir Cecil Wakeley in the chair, are likely to be attended by some 400 American and 600 British surgeons. The three-day programme, which promises contributions from some 70 speakers, includes "panel discussions" on intestinal obstruction, on preoperative and postoperative care, on massive hæmorrhage from the gastro-intestinal tract, and on hand surgery, together with symposia on gynæcological subjects, on cancer, and on cardiovascular surgery; while official lectures in the Royal College of Surgeons will be given by Prof. Howard C. Naffziger (progressive exophthalmos) and Prof. Walter C. MacKenzie (pancreatitis). Local arrangements made by the English college include visits to London hospitals for operating sessions, special programmes for urologists, ophthalmologists, and otolaryngologists, and an exhibition of surgical instruments. There will be a banquet at the Dorchester Hotel, with the Marquess of Salisbury as the guest of honour, and receptions by the president and council of the Royal College of Surgeons, and by H.M. Government. The new great hall of the college, with a seating capacity of about 700, will be used for the meeting.

After arriving in England next week, many of the American visitors will participate in the meeting of the Association of Surgeons of Great Britain and Ireland which is being held in Leeds from May 13 to 15. The Royal College of Surgeons of Edinburgh, where Prof. Evarts A. Graham is to deliver the Fraser lecture, is holding a reception on May 11; and both before and after the London meetings visits will be paid by groups of individuals to various centres in this country and to further conferences on the Continent.

VIRUS VIRULENCE

THE researches of Burnet and his colleagues [1 2] in Melbourne and Hirst and Gottlieb [3] in New York have clearly shown that when two different strains of influenza virus are grown together, under conditions in which both can infect the same cells, new forms of virus are produced which carry properties from both parents. There is still doubt as to the finer details of how these combined forms of virus are brought into being, but meanwhile Burnet and Lind [4] have used the genetics of the interaction between two influenza viruses to study the problem of virus virulence.

All strains of influenza virus grow well in the chick embryo, but some kill the chick rapidly by producing hæmorrhagic lesions. Again, all strains of influenza virus A grow in the mouse lung; most strains do not produce pneumonia, but by adaptation these strains can be trained to cause fatal pneumonia. Likewise, one or two strains of influenza-A virus have been adapted to produce fatal encephalitis on inoculation into the mouse brain. It is possible therefore to have avirulent influenza strains and strains which are virulent in one or more of three different situations, and to study the effects of genetic interaction between avirulent and virulent strains. Burnet and Lind [4] summarise the results of many experiments with the finding that the progeny of crosses of this type generally show many intermediate stages of virulence. This, they point out, accords with the gradual way in which virulence of a virus for a new host is built up by passage, and it suggests that the virulence of a strain is a function of several genes. It is still uncertain how these genes are shared between parents and progeny during the simultaneous multiplication of an avirulent and a virulent strain in the same cell, but Burnet and Lind postulate the existence of virulence genes rather loosely associated with the rest of the "nuclear" apparatus (or genome) of the virus and able to multiply in the host-cell in a rather independent way. Different genomes will have different affinities for these virulence genes, and the two will reassociate at a later stage in virus multiplication.

This type of hypothesis reflects the very rapid progress in the theoretical understanding of the multiplication of these viruses. But the concept of virulence is not an easy one, being inseparable from its counterpart—the susceptibility of the host. Virulence may embody a number of components: the rate of virus multiplication, the amount of virus produced, the possible toxic materials produced, and interference with normal cellular syntheses. Future study will probably be directed to the way in which these and other components are inherited along with the general over-all property of virulence. Meanwhile studies such as those of Burnet and Lind carry wider implications, and should stimulate fresh ideas on the biology of living cells.

THE NEW EPIDEMIOLOGY

BECAUSE of their apparent preoccupation with the work of Snow on cholera, epidemiologists are often accused of having a "Broad Street pump fixation." That charge could not be levelled against Dr. John Gordon, whose views on population problems we noted in a leading article last week. As he said to a meeting of the epidemiology section of the Royal Society of Medicine on April 30, epidemiology is an attitude of mind rather than a body of knowledge, a research discipline now widely applied over the whole field of medicine. Unlike the other basic methods of medical investigation—clinical and laboratory study—it is concerned with groups rather than with individuals, and Gordon believes that it can play a useful and complementary rôle in the study of the ætiology of disease.

Originally, epidemiologists functioned as a fire-brigade, dealing in a patchwork way with dramatic outbreaks of acute infectious illness. Later, by a process of learning while doing (what would now be called operational research), the careful recording and analysis of the sequence of events in a series of outbreaks allowed the generalisation of principles of epidemic behaviour. Even now, the epidemiologist learns his trade by the study of infectious illness. Although still important in the Western world and still dominating all else in many other countries, infections are being supplanted by the degenerative diseases as a cause of death and disability. Some of the old techniques retain their value, but with disorders which evolve slowly, both in the individual and in the community, new ideas are required. The proband method is the only really short cut to a study of the factors which affect the natural history of a disease: essentially, this means the comparison of the past history of known cases of the disease with similar histories for control subjects; the inference is that any differences observed in habit or physical constitution are factors in the causation of disease. Useful as it is in giving clues, this approach has its limitations since we can never be

1. Burnet, F. M., Fraser, K. B., Lind, P. E. *Nature, Lond.* 1953, **171**, 163.
2. Burnet, F. M., Lind, P. E. Symposia on Quantitative Biology, Cold Spring Harbor, New York. 1953: vol. 18, p. 21.
3. Hirst, G. K., Gottlieb, T. E. *J. exp. Med.* 1953, **98**, 41.
4. Burnet, F. M., Lind, P. E. *Nature, Lond.* 1954, **173**, 627.

confident that we are indeed observing cause and effect rather than a fortuitous association between habit and disease. Increasingly, therefore, clues given by retrospective studies are being followed up by carefully planned prospective investigations. Thus, retrospective studies on both sides of the Atlantic suggest that smoking is a factor in the ætiology of cancer of the lung, and, to quiet doubts about the possibility of bias in smoking histories, groups of men whose smoking habits have been ascertained are being followed up over a period of years to ascertain the differential incidence of the disease according to smoking habit.

Within communities, the slow evolution of diseases like cancer and diabetes has meant that their natural history has had to be inferred from vital statistics of mortality. Unique clinical observations, like Pott's identification of scrotal cancer with chimney-sweeping, gave way to a systematic search of occupational mortality statistics for the environmental factors which precipitate malignant change. Now, Gordon observes, complete families and communities are under observation and the evolution of disease is studied over long periods of time. In the U.S.A., a survey revealed that 1·7% of a town's population were suffering from diabetes, half of them without knowing it; and when doubtful cases were followed up over the years, frank diabetes was appreciably commoner among them than among the apparently healthy. If anticipation be the first step to prevention, then such studies show one way towards the control of diabetes. Again, long-term studies of uncommon communities, such as nuns in religious orders, may show the modifying effect of a sheltered environment, with restricted stresses and contacts, on the development of degenerative disease.

Geographical pathology is a term with a vintage flavour, but Gordon believes that the subject will justify its resuscitation. Global war and air transport have given it a new lease of life, for we cannot assume that the facts of epidemic behaviour of a disease can be directly translated from temperate to tropical or arctic climates. On the other hand, a comparison of disease behaviour in different climes can give fresh clues about the modifying effects of habits and environment, and lead on to new prospective studies, which Gordon regards as the modern and natural development of the epidemiological method.

BAKER STREET DIAGNOSIS

"My friend took the lady's ungloved hand and examined it with as close an attention and as little sentiment as a scientist would show to a specimen.

"'You will excuse me, I am sure. It is my business,' said he, as he dropped it. 'I nearly fell into the error of supposing that you were typewriting. Of course, it is obvious that it is music. You observe the spatulate finger-end, Watson, which is common to both professions?'"

Cardiologists, like Mr. Sherlock Holmes,[1] study hands for clues to the personalities and the diseases with which they have to deal. Silverman and Littman [2] have listed the manual signs that cardiac patients may show. The moist palm, the coarse finger-tremor, and the cold cyanotic skin of neurocirculatory asthenia contrast with the flushed warm hands of hyperthyroidism. Clubbing and cyanosis indicate chronic cardio-pulmonary inefficiency. Arachnoidactyly or the short coned fingers of mongolism are a hint that a congenital cardiac lesion should be sought.

Subacute bacterial endocarditis produces signs in the hand so specific that they should be woven into the engrams of every examination candidate. Censors do not readily forgive a confusion between Osler's node (first described by Mullen) and the Janeway lesion; the former is a small raised tender red nodule in the skin of finger or toe, the latter a painless erythematous patch in the palm. The candidate must notice also, as he rapidly inspects the proffered hand of his "short case," the splinter-hæmorrhage beneath the nail, the clubbing of the finger-ends (particularly in the forefinger and thumb), and the pallor of the palmar creases.

Diagnosis, like detection, begins with a clue. Spatulate fingers, clubbed fingers, bitten nails, painted nails, nicotine stains, ink-stains, hands firm or fleshy, moist or horny—these are often the first clues from which we construct our mental picture of the disease and of the patient's personality. Flaccid pliant hands are, for example, found in persons who habitually use kinæsthetic modes of thought and expression [3]; they contrast with the stiffer and less expressive hands of visualisers and verbalisers. Yet manual signs seldom justify a spot-diagnosis. Even the great Holmes nearly fell into the error of confusing a pianist's hand with a typist's, until he extended his examination and concluded:

"'There is a spirituality about the face, however,'—he turned it gently towards the light—'which the typewriter does not generate. This lady is a musician.'"

ACUTE OSTEOMYELITIS

PENICILLIN has removed the dread of acute osteomyelitis as a mortal disease; and large series are now published in which there is not a single death. But although most people would agree that the very early infection can be completely cured or aborted by antibiotic therapy alone, the outlook is less cheerful in cases which arrive in hospital about the fourth or fifth day of their illness, as they commonly do; and chronic osteomyelitis remains as serious a problem as ever. We have today little more to offer the patient with chronic bone infection than we had a generation ago; but, on the other hand, we have good opportunities of preventing the development of chronicity.

During the early years of penicillin, there were those who advocated the use of penicillin alone, pus being released or aspirated only when a frank abscess presented. But, largely as a result of the excellent work of Trueta on the likelihood of interference with the blood-supply of the bone, this laissez-faire attitude has largely fallen into the background, and most pædiatricians and orthopædic surgeons would agree that early evacuation of pus is of great importance. The days of open drainage and extensive guttering of the bone are past, but the question remains whether operation and drilling of the bone is best or whether aspiration alone, repeated if necessary, is sufficient. Powerful evidence in favour of operation has been produced by Trueta and his colleagues, who believe that the stripping of the periosteum by œdema fluid, and then by pus, causes ischæmia of the underlying bone and later severe bone changes, occurring after the infection has apparently been controlled. Most of the advocates of aspiration alone have been pædiatricians, and their series often contained a preponderance of infants. Hitherto no-one has been able to produce comparable series which would help in deciding the question.

In their article in this issue, Mr. Bremner and his colleagues try to give an impartial answer from the results of their trial, in which some cases were treated by aspiration and others by operation. As far as possible, they have adopted strict criteria in selecting comparable groups of cases, and this strictness means that they have been limited to the relatively small total of 23 cases. They set out to decide whether, when, and how to remove any pus present. They are in no doubt that it should be removed and the earlier the better; they found little to choose between the results of repeated aspiration and of incision, drilling, and suture. They

1. Conan Doyle, A. The Complete Short Stories of Sherlock Holmes. London, 1928; p. 640.
2. Silverman, J. J., Littman, D. S. *New Engl. J. Med.* 1953, **249**, 839.
3. Short, P. L., Walter, W. G. *Electroenceph. clin. Neuro-physiol.* 1954, **6**, 29.

prefer aspiration for various reasons, but its successful application "demands a high standard of clinical judgment, with daily reassessment, and may not be achieved consistently except in centres where many cases are seen."

Trueta and Morgan [1] have just published the late results of the first hundred cases treated by Trueta's method, and it is interesting to see how very similar their findings are. Trueta advises larger doses of penicillin (1,000,000 units per twenty-four hours), but in both series penicillin is given for an average period of thirty days and recovery takes sixty to eighty days. It is good to note the low proportion of penicillin-resistant staphylococci both in Newcastle and Oxford at the time of these trials, but perhaps resistant strains are now more troublesome. Trueta gives a very clear-cut plan of treatment; operation is undertaken unless the second examination, twenty-four hours after admission, shows clear evidence that the condition is improving. It seems that this twenty-four-hour rule was followed irrespective of the physical signs on admission, but that operation was, in fact, undertaken in nearly every case. Although the two groups are not strictly comparable, it seems likely that radiologically the Oxford patients have suffered rather less bone damage than the Newcastle group, but the latter perhaps had more severe infections. Even though they are described as "late results," the Oxford cases are of less than ten years' duration, and, alas, osteomyelitis can flare after many decades of dormancy.

Even though the question of detail remains uncertain, these two pieces of evidence agree in principle. For the surgeon without wide experience of this condition, Trueta's open evacuation of pus and limited drilling of the bone will be simpler in application and it will probably produce less anxiety and less unwanted bone. But neither side can yet be said to have won the day.

ORIGIN OF LIFE

Is life universal, or confined to our planet? Was there a single Creation in time past, or must we try to conceive of life as a regular by-product of matter, perpetually renewed somewhere in the universe—just as, according to the theories of Fred Hoyle and others, matter itself is continually created out of void? It is less than a hundred years since Pasteur gave the coup-de-grâce to belief in spontaneous generation as an everyday process on earth, and knowledge of what goes on elsewhere awaits the explorations of the astronauts. Will they really meet intelligent sentient beings straight from the pages of science fiction? Many new facts and interpretations in astronomy, geophysics, and biochemistry throw light on these problems. More important, as the four contributors to a popular symposium [2] make plain, there has recently been something of a philosophical reorientation in scientific thinking on the subject.

Partly this is the recognition that the term "living" must be applied to practically anything which can catalyse the production of more of itself from raw materials in its surroundings. To think only in terms of green plants and legged beasts is too restrictive; these are the forms of living things shaped by purely terrestrial conditions, but elsewhere evolution might take a totally different and unimaginable path. On Jupiter, for instance, liquid ammonia has the prevalence of water on earth: are there races of self-reproducing units in those cold nitrogenous seas? Haldane goes so far as to imagine that there might be a new form of life in the interior of the earth—organisms made of molten silicates, drawing the energy for their growth from the slow oxidation of the metals in the core. It is clear that "life" no longer implies necessarily the protein-carbohydrate biochemistry to which we are accustomed. Those who study meteorites, embark on interplanetary voyages, or still look to discover spontaneous generation on earth must seek with innocent eyes, with minds cleared of all old preconceptions, if they are to see the alien forms that life may take.

Even simple terrestrial organisms such as amœbæ or bacteria are extremely complex biochemically, and cannot possibly represent starting-points of the evolution of the animals and plants we know. Their spontaneous generation in the dilute soup which the seas may have been a thousand million years ago is as unlikely as it would be in broth under modern laboratory conditions. Biologists therefore recognise that the evolutionary line must be prolonged backwards through much simpler chemical systems to the simplest of all—the self-reproducing molecule. Perhaps there were many of these molecules of different kinds competing against one another for millions of years. Perhaps they had a tendency to fuse or aggregate. Perhaps once in a hundred thousand years the fusion of two dissimilar self-reproducing molecules led, not to the extinction of one or both partners, but to a viable product with enhanced powers of replica synthesis. Such subvital units of many kinds may have been the true raw material of evolution, and the creation of such units is the proper goal in any future work on spontaneous generation, or biopoiesis.

This leads to a third theoretical development, which indicates the kind of subvital units to expect at the dawn of terrestrial life. It has often been pointed out how admirably the earth's physicochemical nature fits it for the maintenance of life. This is so, says Bernal, because it is the chemical and physical properties at the earth's surface that have directed primitive evolution. Chemical processes which occur in almost all organisms are likely to be the most primitive and to most resemble the changes in ancient rocks—the oxidation and reduction of iron and sulphur, and the polymerisation and break-up of phosphates. The fact that proteins are strongly adsorbed by clays suggests some kind of spatial resemblance between clay and protein, which might have resulted if the first subvital protein-like units arose in the interstices of a clay "soil" rather than in the open sea. Living things, unlike even the primitive sea, contain much potassium: clays also adsorb this element strongly. On the other hand, clays are aluminium compounds and if life evolved under their influence it is surprising that aluminium has no metabolic rôle in the organisms of today. This objection of Pringle's however, leaves the principle of the method unassailed.

Meanwhile, the geochemists continue to delineate the setting for the play of life on earth. The earth arose by dust condensation perhaps 4000×10^6 years ago, and has never been very hot—perhaps no hotter than boiling water on the surface. Its early atmosphere may have been chiefly of methane and ammonia, with some water and hydrogen: lightning striking through such a gas mixture produces traces of amino-acids, such as glycine and alanine. Study of the relative abundance of the two isotopes of sulphur—S^{32} and S^{34}—in rocks of various ages indicates that the first photosynthetic sulphur bacteria (which use one isotope preferentially) began their existence about 800×10^6 years ago. Biochemists are unravelling the universal chains of living tissues—the polypeptides, polysaccharides, and polynucleotides—and describing in a few organisms, such as tunicates and beetles, the bizarre chemistry which may represent vestiges of the biochemical past. Even if the creation of life in the laboratories remains an unattainable ideal, the new ideas are going to stimulate valuable research.

1. Trueta, J., Morgan, J. D. *Brit. J. Surg.* 1954, **41**, 449.
2. Haldane, J. B. S., Bernal, J. D., Pirie, N. W., Pringle, J. W. S., *New Biology*, no. 16. Harmondsworth: Penguin Books. 1954. Pp. 135. 2s.

Prof. F. L. HOPWOOD, D.SC., consulting physicist to St. Bartholomew's Hospital, London, and hon. secretary to the British Empire Cancer Campaign, died on May 2 at the age of 70.

Special Articles

TUBERCULOUS DIABETICS

The Birmingham Regional Service

GEORGE LUNTZ
M.R.C.P.
PHYSICIAN-IN-CHARGE, DIABETIC UNIT, ROMSLEY HILL HOSPITAL, HALESOWEN; CONSULTANT CHEST PHYSICIAN, BIRMINGHAM CHEST CLINIC

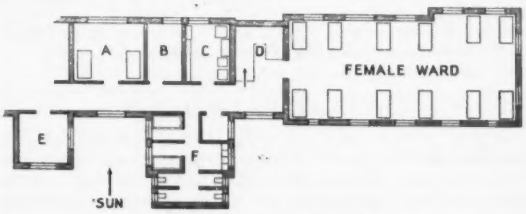
THE Central Health Services Council [1] has suggested that, as tuberculous diabetics require special arrangements for their treatment, they should be concentrated in sanatoria where they can have expert advice and where there are facilities for laboratory investigation and supervision. The Ministry of Health [2] recommends that diabetic services should be planned on a regional basis, with provision for special groups of patients such as the tuberculous, the pregnant, and the aged. Tuberculous diabetics in the region should, where practicable, be concentrated in a single sanatorium closely linked with a diabetic clinic, and in Birmingham for the past two years we have provided a coördinated service for these.

It is estimated that there are 3 diabetics per 1000 of the population, and that 3 out of every 100 diabetics show radiological signs of pulmonary tuberculosis. On this estimate there are 3900 tuberculous diabetics in England and Wales. All need careful supervision, and probably a quarter or more have active tuberculosis.

DOUBLE NEEDS

The diabetic with a complicating tuberculous infection is unsuitable for domiciliary treatment. The detailed attention required for careful management of these two diseases cannot be given except in a special hospital unit with adequate laboratory facilities; and, moreover, there should be no delay in providing inpatient treatment for the newly diagnosed case, which is a medical emergency. It is all too common to find that diabetics who are admitted to a sanatorium for the treatment of a complicating tuberculous infection have their diabetes inadequately treated, with serious consequences. These patients need the close supervision of a physician experienced in the management of both diseases and they also need specialised nursing care. A dietitian or a sister trained in dietetics is essential, and a visiting chiropodist is also required, since the care of the feet is important in the management and follow-up of diabetics.

Until recent years the combination of these diseases had carried a poor prognosis, but this was due to insufficient and haphazard treatment of either or both conditions. The modern treatments for both diseases have changed the outlook. Chemotherapy and the better application of collapse therapy and resection have greatly improved the control of pulmonary tuberculosis, while the newer insulins and the modern dietetic methods which these have permitted have revolutionised the care of diabetes. When both diseases are effectively treated the prognosis of tuberculosis in the diabetic today is comparable to that in the non-diabetic. But regional units are needed to achieve these modern standards of treatment for both diseases.



Plan of kitchen, &c., and female ward.

A, emergency and/or observation ward. **B**, duty room. **C**, diet kitchen. **D**, staircase leading down to male ward. **E**, laboratory. **F**, bathroom and lavatories.

THE BIRMINGHAM SERVICE

The scheme for the management of tuberculous diabetics in Birmingham was started in September, 1951. It includes:

1. The inpatient hospital unit.
2. The outpatient consultative clinic.
3. The domiciliary service.

All three are essential, since they ensure continuity of supervision and treatment both of inpatients and outpatients by the same skilled staff.

The inpatient unit at Romsley Hill Hospital has 25 beds. It consists of two 12-bed wards (one male and one female), with a single side-ward for observation or for emergencies. The unit has its own dietetic kitchen close enough to the wards to be supervised by the dietetically trained sister-in-charge. Special cooking and elaborate dietetics are not necessary, but accurate weighing or measuring of foods is; and all meals are served from this kitchen by an individual tray service for each patient. There is also a small laboratory with facilities for examination of urines, estimation of blood-sugar levels, and other essential investigations. A dietitian is attached to the unit and helps in the education of patients in hospital and in the provision of a varied diet.

The outpatient consultative clinic is held fortnightly at the Birmingham Chest Clinic. Here all tuberculous diabetics under outpatient supervision are seen by the physician-in-charge, and patients discharged from the inpatient unit are followed up. The dietitian also attends this clinic.

The domiciliary service has the lively interest and support of both the local health authority and the general practitioners. Health visitors, district nurses, home helps, the therapeutic dietitian, and the physician coöperate in this. When necessary the physician visits patients at

Diet kitchen.

1. Annual report for the Central Health Services Council, 1952.
2. H.M.C.(53)62.

home, usually at the request of a general practitioner, or after discussion with a health visitor or the dietitian. The dietitian pays home visits once a month, in much the same way as health visitors do for other tuberculous patients, and helps in the day-to-day problems of the diabetic who is taking insulin. Advice is given on diet and the preparation of meals, insulin dosage and injections, and urine-testing.

This integrated scheme provides close liaison between inpatient treatment, outpatient supervision, and domiciliary care. The best results for both diseases can be obtained only under such a comprehensive service of long-term management.

The unit for the treatment of patients with pulmonary tuberculosis and diabetes was established on the recommendation of the tuberculosis advisory committee of the Birmingham Regional Hospital Board. It is a pleasure to acknowledge the interest of Dr. S. J. Scurlock, the senior administrative medical officer, in all the complex problems of the treatment of the tuberculous diabetic.

CLINICAL PATHOLOGY

MANY people believed that if the services of the hospital pathological laboratory were made available to general practitioners, the extra burden of work would be more than the laboratory could manage. But this fear has proved unfounded: in 1952, 55% of all hospital pathological laboratories dealt directly with G.P.s' requests, and these requests accounted for less than 5% of the work in these laboratories.[1] So there is good reason to encourage more laboratories to offer this service and to extend what Dr. W. N. PICKLES, president of the College of General Practitioners, has called "the happy alliance between the general practitioner and the laboratory." Dr. Pickles was speaking at the 52nd general meeting of the Association of Clinical Pathologists, held in Harrogate from April 8 to 10, and he drew examples from his long experience to demonstrate the increasing help which laboratory investigation has given to the practitioners' work.

The following are summaries of some of the papers read at the meeting:

Ulcerative Colitis and Cancer

Discussing the pathology of ulcerative colitis, Dr. CUTHBERT DUKES (London) observed that almost all those who, during recent years, had inquired into the relation between ulcerative colitis and carcinoma had reached the conclusion that colitis predisposed to cancer and that the extent of this predisposition had been underestimated in the past because of difficulties in diagnosis, both clinical and pathological. Dr. Dukes's experience was based chiefly on the examination of colons removed by colectomy from severe cases of ulcerative colitis. In a consecutive series of 120 cases of severe colitis, carcinoma was found in 7 (5·8%). The average duration of symptoms of ulcerative colitis before the onset of cancer was fifteen years. The answer to the question "How often does cancer follow ulcerative colitis?" depended on the severity of the disease and on the duration of symptoms; any patient who had had severe ulcerative colitis for ten to fifteen years was exposed to a serious risk of cancer.

Miliary Tubercles in Bone-marrow

Dr. J. L. EMERY and Dr. N. M. GIBBS (Sheffield) reported the results of examination of the bone-marrow in cases of miliary tuberculosis. The present methods of diagnosis depended largely on the radiological appearance of the lungs and examination of the eye for tubercles, and by these means alone it was impossible to establish the diagnosis in more than half of the cases. A study of 0·1 ml. of bone-marrow from 44 children who had died with generalised miliary tuberculosis had revealed miliary tubercles in 23 cases. In these 44 children a clinical diagnosis of miliary tuberculosis had been made by radiography of the chest in 13 and examination of the eye in 14 cases. These two methods in conjunction produced the diagnosis in 18 cases. Marrow biopsy would theoretically have enabled the clinical diagnosis to be made in a further 5 cases.

Nephrocalcinosis and Hypercalcæmia in Infancy

Dr. I. M. P. DAWSON and Dr. W. S. CRAIG (Leeds) discussed the case of a male child who, at the age of five months, had anorexia, vomiting, constipation, and hypotonia. The condition persisted, with periods of irregular fever, till he died six months later. Investigations showed raised serum-calcium and blood cholesterol and urea nitrogen. Other biochemical findings, including plasma bicarbonate, alkaline phosphatase, and chloride, were normal. The urine was acid and contained pus cells. X-ray examination showed increased density of the skull and long bones. Necropsy revealed bronchopneumonia, without parathyroid hyperplasia or gross changes in other organs. Microscopically, the lungs showed unresolved pneumonia. In the kidneys there was patchy hyaline change in some glomeruli, and both calcium-containing and eosinophilic casts in the distal and collecting tubules, with some calcium deposition in surrounding tissue. The proximal tubules showed vacuolation and degeneration with calcium deposits in degenerate areas. This case was thought to be similar to those described by Lightwood[2] as idiopathic hypercalcæmia. The pathological changes are those of a nephron nephrosis of unknown ætiology, and the biochemical disturbances are probably secondary to primary renal damage.

Hæmoglobin S and Hæmoglobin C

Dr. H. LEHMANN (London) and Dr. G. M. EDINGTON (Accra) reported a case of sickle-cell-hæmoglobin-C disease from the Gold Coast. Six human hæmoglobins are now known. Five seem to be alleles genetically: normal-adult (A), sickle (S), C, D, and E. Fœtal hæmoglobin (F) is not usually found after the first year of life, but it can accompany certain hereditary anæmias and other anæmias acquired before the physiological hæmoglobin-F formation came to an end; hæmoglobin F is resistant to alkali-denaturation. A, S, and C hæmoglobins differ in their behaviour on paper electrophoresis, and a further feature of S is its tendency to gel at reduced oxygen tension. At pH 8·6, A migrates fastest, S more slowly, and C is slower than A or S. D has the same electrophoretic properties as S but does not gel at reduced oxygen tension. E migrates at alkaline pH at the same rate as A, but differs from A at acid pH. D and E have so far been found in one family each, but S and C seem to be widely distributed, and their incidence pattern is of anthropological interest. The present case is the first to be reported from outside the U.S.A. A systematic survey of C incidence in West Africa is now in progress.

A Calcium-tolerance Test

Dr. B. E. C. NORDIN (London) described an intravenous calcium-tolerance test which might assist in the diagnosis of certain types of metabolic bone disease. Calcium gluconate (15 mg. of calcium per kg. body-weight) was given intravenously in normal saline over a four-hour period after the subject had been on a low calcium diet (100 mg.) for three days. In 9 normal subjects, the mean urinary calcium excretion during the twelve hours after the infusion began was 50·7% of the administered dose: the normal range was 38–62%. In 7 cases of proven osteomalacia the excretion was always less than 25%. In 9 cases of osteoporosis the excretion was well above the normal range in 3 (all young adults) but within the normal range in 6 (all postmenopausal osteoporosis). An interesting aspect of the test was the fall in urinary phosphate clearance which followed the infusion and which was greatest in the patients with osteomalacia. It seemed possible that this was the result of suppression of parathyroid activity.

Pasteurella Septica in Bronchiectasis

Dr. J. M. TALBOT (London) said that most examples of *Pasteurella septica* infections in man were wounds

1. See *Lancet*, 1953, ii, 559.

2. Lightwood, R. *Arch. Dis. Childh.* 1952, 27, 306.

inflicted by animals, but there were some cases in which no direct animal contact was known. The organism seemed to live as a symbiont in the respiratory tract of patients with disease of the bronchi, lungs, or nasal sinuses, especially those with bronchiectasis. He described a case in which this organism was persistently present in the sputum—a finding not previously reported in this country. More examples of this condition might be found if a careful watch was kept.

Epidemiology of Proteus Infections

Dr. A. C. CUNLIFFE (London) described work on the serological classification of *Proteus vulgaris*. This had provided an accurate method of subdividing the species, and the epidemiology of proteus infections in a number of populations has been elucidated. The typing of strains isolated at a general hospital and from patients in a burns unit suggested that infection with *P. vulgaris* occurs in two ways—by self-infection from the gut and by cross-infection.

Hæmatological Control of Risks from Irradiation

Dr. R. H. MOLE (Harwell) said that in human cases of serious anæmia due to radiation little if any warning of the illness was given by the white-cell count. Changes in the blood-count were unlikely unless exposure to radiation was many times the maximum permissible dose. Damage to the gonads occurred with smaller dose-rates. Physical measures of control seemed preferable to hæmatological ones.

SMALL-LIST DOCTORS

AT the request of the Ministry of Health and of the General Medical Services Committee the Working Party on the remuneration of general practitioners have been considering whether the new arrangements for the payment of general practitioners introduced in April, 1953, have caused hardship to single-handed doctors with National Health lists of fewer than 1200 patients. Their report to the G.M.S. Committee [1] shows that a small group of doctors starting in practice and a larger group of elderly doctors—some 500 to 600 in all—have been placed at a disadvantage.

To help these two groups the Working Party recommend that a basic payment of £250 per annum should be made to single-handed doctors, who are starting in practice or are over 60 years of age, with lists of between 300 and 1200 patients, and that a fee of 10*s*. should be paid, in addition to the normal capitation fee, for each patient on their lists between 300 and 500. No loadings under the usual arrangement would be payable to them.

The Working Party propose that doctors starting in practice would be eligible for these supplementary payments only for five years during which they should have an increasing list. Payment would be withdrawn where a list decreased over four consecutive quarters by more than 10%.

To come under the scheme a doctor over 60 should have been in single-handed practice in the area where he is now practising for at least ten years. Payments would cease if his list dropped below 300 and remained below 300 for four consecutive quarters. Payments would be reviewed when the doctor reached the age of 70.

The Working Party estimate that the scheme will cost £120,000 a year, which would be met from the pool already set aside to meet any hardship arising out of the new rates of remuneration. They propose that payments should be made without regard to the doctor's total professional income and only with regard to the size of his list. They should be retrospective to April 1, 1953.

The G.M.S. Committee have accepted the recommendations and will present them to the annual conference of representatives of local medical committees.

1. *Brit. med. J.* May 1, 1954, suppl. p. 206.

Public Health

MATERNAL RUBELLA AND CONGENITAL DEFECTS

C. METCALFE BROWN
M.D. Glasg., D.P.H., Barrister-at-Law
MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER, MANCHESTER

BARBARA J. NATHAN
M.A., B.M. Oxfd, D.Obst.,
MEDICAL OFFICER, MATERNITY AND CHILD WELFARE, MANCHESTER

THE original work of Gregg (1941) on rubella and congenital defects stimulated much interest and further research. In this country the subject was systematically pursued by Clayton-Jones (1947). *The Lancet* (1946) said:

"For though german measles is the commonest exanthem in adults the chances of a mother catching the disease early in pregnancy are very small indeed—a rough estimate could no doubt be made on the figures from Manchester, one of the few places where rubella has been notifiable."

Rubella has been notifiable in the City of Manchester since 1916 in relation to first cases in a household, and since 1920 for all cases. For some years we have been making an investigation based on the Manchester notifications, which in recent years have been as follows:

Year	*Notifications*	*Year*	*Notifications*
1938	375	1946	351
1939	739	1947	1247
1940	3543	1948	2022
1941	2777	1949	386
1942	2624	1950	375
1943	940	1951	976
1944	3706	1952	8010
1945	358	1953	573

The population of Manchester was 732,900 in 1938 and 701,800 in 1953.

METHODS OF INVESTIGATION

There appeared to be two methods of determining the relationship or otherwise between rubella and congenital defect. One method is to investigate the antenatal history of the mother if congenital defect in the infant has been discovered. The other method is to note the occurrence of rubella in the mother and to observe the pregnancy and its outcome as regards mother and child.

The first method was followed in Manchester in 1946, when Dr. G. Stewart Smith, then director of pathological services in the City of Manchester, surveyed the results of necropsy of 35 infants who had died in hospitals and had congenital malformations. Investigation of the history of the pregnancy of each mother was next undertaken to ascertain whether or not she had had rubella during pregnancy. No history of rubella was found in these cases.

In 1952 we analysed in retrospect the health department records of (1) rubella notifications in 1936–51 for females aged 15 or more; (2) notifications of birth in corresponding years related to these rubella notifications; and (3) congenital malformations in the children.

RESULTS

The results were as follows:

Year	*Notifications*	*Pregnancies*	*Congenital abnormalities*
1936	43	—	—
1937	32	—	—
1938	15	—	—
1939	53	—	—
1940	725	6	—
1941	197	1	—
1942	199	4	—
1943	72	—	—
1944	514	3	—
1945	26	—	—
1946	12	—	—
1947	101	1	—
1948	101	—	—
1949	16	—	—
1950	9	2	—
1951	41	2	—

These figures are of interest, but the results are negative. This is not surprising in view of the fact that most of the records were old, and no examination of the children was conducted for this purpose after the age of 5 years. It appears to be sounder to ascertain first the incidence of rubella during pregnancy and then to seek for congenital abnormalities. This method was used in 1952, when the level of rubella notifications reached unprecedented heights and therefore presented an unusual opportunity of dealing with large numbers.

In 1952 rubella notifications in females aged 15 or more numbered 468. We have traced 28 cases in which the women were pregnant at the time of rubella infection. Data on these 28 cases are given in the accompanying table. The defects specified are gross, and observation is being continued to ascertain the appearance of latent defects, if any, when the children are older.

Of the 28 cases of rubella in pregnancy, 21 were ascertained as a result of formal notification and 6 as a result of a concurrent and wider investigation which was made by the Ministry of Health in conjunction with the Manchester and many other local health departments and is continuing. The remaining case was found by one of us (B. J. N.). It follows that only 21 of the 28 pregnancies are included in the 468 notifications, but all of the 28 mothers had rubella at some time during their pregnancies.

There were 5 cases of gross congenital abnormality in the children. The case of missed abortion is not included as congenital abnormality, although it is possible that the fœtus died from rubella.

5 cases of congenital abnormality from 28 cases of rubella in pregnancy is 17·9%. In 1952, 245 cases of congenital abnormality were ascertained in the 12,367 live babies born in Manchester—i.e., 2·0%. In 13 of the 28 pregnancies, rubella occurred before the thirteenth week of pregnancy, and among these 13 cases the infants had congenital abnormalities in 4 (30·8%) instances.

This report is provisional only, and the final assessment of the Manchester figures cannot be made until observations over some years have been completed. If the figures had been much larger and equally representative, the difference between 17·9% and 2·0% would have provided good evidence of the effect of rubella in the causation of congenital abnormalities. Some significance may perhaps be attached to the high proportion of cases of congenital abnormality following rubella in early pregnancy. The smallness of the figures limits their value.

CONGENITAL ABNORMALITIES IN OFFSPRING OF WOMEN WHO HAD RUBELLA DURING PREGNANCY IN 1952

Mother's age (yr.)	Parity	Week of pregnancy in which rubella occurred	Congenital abnormalities
21	1	22	..
18	1	26	..
26	5	12	..
25	2	12	Infant died at 3 days; congenital cardiac lesions
28	4	39	..
28	3	1	Bilateral cataract and microphthalmos; thrombocytopenic purpura
27	3	At time of last menstruation	..
28	4	27	..
26	1	4	Stillbirth; congenital cardiac lesion
29	2	11	..
31	1	15	..
38	3	15	..
26	2	1	..
22	2	12	Missed abortion; fœtus died shortly after rubella infection
29	4	10	..
27	2	13	Family lost sight of
21	1	32	..
25	1	6	..
33	2	33	..
27	1	8	..
20	1	5	*
22	2	24	..
21	1	7	..
23	3	14	..
26	3	30	..
32	8	22	..
24	1	21	Stillbirth, anencephalus
35	1	1	Cataract of right eye

* Ectopic gestation, abortion of tubal pregnancy; insufficient evidence of congenital abnormality.

REFERENCES

Clayton-Jones, E. (1947) *Lancet*, i, 56.
Gregg, N. M. (1941) *Trans. ophthal. Soc. Aust.* 3, 35.
Lancet (1946) i, 201.

Illnesses Treated in Hospitals

The Registrar-General's supplement [1] on hospital inpatient statistics for 1949, published this week, forms part of the study of morbidity statistics that is being undertaken in the General Register Office, and it is a companion volume to the 1949 supplement on general morbidity, cancer, and mental health.[2] Some preliminary figures based on the first six months of the inquiry were published [3] in 1951, and the tables now published relate only to the full year 1949. The figures cover the majority of teaching hospitals and 24 hospitals under regional boards.

The final diagnoses of principal conditions treated or investigated are classified according to the International Classification of Diseases and Injuries. The main table reproduces this classification, with minor exceptions, in its entirety; and the number of men and women at different ages discharged during the year, together with the number of deaths in hospital at all ages, are shown for over 1200 diseases or injuries. The detail in which the main diagnoses are shown makes it possible to rearrange them, within the limits of the classification, to form other clinical disease-groupings. There are some interesting variations in the sex-ratios for certain diseases; for example, there were nearly twice as many boys as girls admitted for appendicitis at ages 1–4 in the teaching hospitals, but nearly twice as many young women as young men at ages 15–24. Other tables show the variation in average duration of stay for selected diseases and disease groups according to age in the London teaching, provincial teaching, and regional board hospitals. There were often appreciable differences in the average duration of stay for the same disease between the teaching hospitals in London and in the rest of England and Wales. In most cases, the stay in hospital was shorter for the provincial teaching hospitals, and this is reflected in the average stay, over all conditions, of 16 days for men and 14 days for women, compared with averages of 21 and 20 for the London teaching hospitals. In the relatively few hospitals under regional boards which were included in the inquiry the averages for males and females were 23 and 19 days respectively, but these figures were much influenced by the higher proportions of old patients and patients with chronic diseases who have relatively longer durations of stay.

The new supplement adds useful information to what has already been collected about the hospital service, and it will be a help both in the administration of the service and in medical research.

A Smokeless Zone in Bolton

Last December the town council of the county borough of Bolton designated an area of approximately 86 acres in the town centre as a smokeless zone, and the Minister of Housing and Local Government has now confirmed the order bringing this into effect as from Nov. 1, 1954. In his report to the health committee, the medical officer of health, Dr. R. W. Elliott, says that occupiers of premises in the zone will be given instructions, and a sanitary officer specially trained in smoke abatement will be available to advise them. There are 1050 premises in the zone—residential, business, and manufacturing, including a brass foundry, two engineering works, a paint factory, and a tannery.

1. The Registrar-General's Statistical Review of England and Wales, 1949: Supplement on Hospital In-patient Statistics. H.M. Stationery Office. Pp. 485. 15*s*.
2. See *Lancet*, Jan. 9, 1954, p. 110.
3. Studies on Medical and Population Subjects no. 4 Hospital Morbidity Statistics. H.M. Stationery Office, 1951.

In England Now

A Running Commentary by Peripatetic Correspondents

I HAVE just been looking at the children in the Academy Summer Exhibition. I always look at the children because I may not know much about Art (as they say) but I do know what children look like, as I sit diagnostically in front of the little horrors for most of my working day. As usual, this year I was incredulous of all those clean faces. Some, at least, had untidy hair. Prosper Devas did, and he looked as if he were anxious to get away. He was painted by Anthony Devas, perhaps his father who knows him well. Master Clive Forster-Cooper was sitting very still. From his expression I doubt if he could keep it up for long.

One trouble is that children seldom look at you for long if you are looking at them, and when I look at a picture in which the child is looking at me it seems all wrong. I feel as if I am intruding. Perhaps that is why I prefer sculpture, because you can walk round it and study it unobtrusively, just like a real child. Not that the Infant Imogen would have minded being looked at, because she is too young. I thought she would have to have her nose wiped quite soon and that seemed homely. I was a bit worried about Francesca's flush, but Paul seemed lively enough. I think he might be a bad lad: I hope so. But talking of bad lads, what is John Walter Wolseley doing with that whip? Best of all I liked Ismond Rosen's Honey. She looks best from a three-quarter front view, her expression is quite different when she sees you looking at her, which is just what I said.

* * *

While in a peripatetic state of mind at a lecture on pharmacology the other day, it occurred to me that sometimes the Fates must be rather cold. "Why?" you ask. Well, they have atropin, lachesin, but no clothin. Moreover it often gets a bit parcæ.

* * *

The *Rosemary Ann* is lying on the mud-flats with her side stove in. News of the disaster came from two local fishermen called Dick Rag and Bill Grimes who sent me a letter, distasteful in tone and unmentionable in syntax, to say they had salvaged my sailing dinghy in the recent gales, floating bottom-up with all the tackle gone. They suggested I paid them compensation amounting to a third of her value or they would put the matter into the hands of the Receiver of Wrecks. I grabbed the phone.

"What's all this damn nonsense about my boat and the Receiver of Wrecks?" It was a bad start but I was in no mood for the conventional approach.

"No nonsense about it," said a voice which I later identified as Grimes's. "If you don't pay up, me an' Rag will report it to the Receiver, and then you're in for a packet . . . and they'll impound your boat."

I got in touch with H.M. Customs and found to my dismay that their claim was justified. Accordingly I phoned Grimes again and told him I would meet him on the shore to talk business. I found him and Rag sitting on my upturned boat smoking their pipes.

"Well, gentlemen, I believe you were good enough to save my boat—a very seamanlike action. I am grateful to you. . . ." Such an opening ought to have shrivelled them into powder but as far as I could see they were unmoved.

"Grand evening," said Grimes, knocking out his pipe against the keel.

"Tidy weather," said Rag.

I began to feel hot. "Shall we get down to business? If you feel entitled to a little compensation—some small token reward for your trouble—I am not the person to be unmindful of a good turn. That, after all, is why we are all here—to do one another good turns."

"Wind's veering," said Grimes.

"Blowing southerly," said Rag.

I had an ungovernable impulse to break the tiller of my boat over their heads. Unfortunately it had been lost with the rest of the tackle. "How much do you want?" I said.

Rag stared fixedly at a starfish near his feet. Grimes spat with precision into a small rusty tin two yards away. The curlews engraved their swift beauty into the evening sky and the tall herons stood motionless in the shallows of the tide listening for the fall of night.

"What is it worth to buy?" asked Grimes, looking out to sea.

This was a cunning question. If they really wanted to buy it, I ought to put the price up. If they were fishing for a valuation on which to base their salvage claim, I ought to keep it low. I looked at Rag for a clue. He was still looking at the starfish with a face more full of emptiness than I thought permissible to the human race. Grimes pulled steadily at his pipe and looked as open and ingenuous as the tomb of Tutankhamen. An idea of delicate and refined subtlety side-slipped my conscience and crept into my mind.

"I would never sell her."

Rag lifted his eyes from the starfish and fastened them on a worm cast. Grimes stopped puffing and a thin wisp of smoke climbed up from his pipe like a tenuous question-mark.

"Why not?" he asked.

"Before I brought her to these parts the previous owner set out in her one morning on the ebb for a day on the cockle beds. At sunset she came back on a strong flood tide, sheet lashed to the tiller and running with the wind—alone. He was never found. No, gentlemen, she is a boat to be reckoned with and knows how to take her revenge."

They remained rigidly attentive during my story, and I suspected they had seen, with alerted imaginations, the sudden squall, the massive and voracious sea, the shroud in the folding wave.

Grimes spat once again at the tin . . . and missed. Rag pulled his jerkin more closely about him.

"Getting a pit parky," he said.

"Aye, getting a bit thin," said Grimes.

They moved off slowly over the ribbed sand to their nets by the shore. And I was left alone with the *Rosemary Ann*.

* * * *

My window-cleaner just home from the sanatorium was anxious to return to work. He was not impressed by my slight concern about the strain of climbing ladders and carrying heavy buckets. "You see, sir," he explained, "I am the boss. I only washes bottoms."

* * *

They B.B.C. chaps' wanting to build their T.V. station on Hessary Tor is bothering us folks down Widdicombe way, for my old grandad swears we've ancient common rights to that part of Dartmoor. Gaffer says that if he remembers rightly we used that land way back in Saxon times; but anyway, even if we didn't, we certainly got it again as a grant from they Norman furriners who came down here not so long ago and called theyselves lords of the manor or some such fancy name. Us villagers didn't hold with your Statutes of Merton and Westminster, we weren't frightened off by your Black Death, we weren't pushed out by your Tudor wool trade or your Inclosure Acts, and we don't see why us Devon men should have to suffer all that there T.V. nonsense on our moor.

You can't teach our Gaffer anything about his common rights of pasture, piscary, turbary, and estovers; we know what's ours and what we can take for nothing from the Moor. Now if they B.B.C. chaps was to buy old Betsy's cottage next the smithy they would be commoners along of us, but Gaffer's not too happy about what they lawyers call profits à prendre; for as he says they be taking nothing from the moor, they wants to put it in. But then, he says, look at all they other folk in Exeter and Plymouth who will be pinching our T.V. waves; that'd be carrying common rights too far to his way of reckoning.

* * *

Patient: "I think I've got a herbaceous cyst, doctor." I forgot to see whether she had green fingers.

Letters to the Editor

THE BOMBS

SIR,—I think Dr. Stafford-Clark's reply last week to my letter of April 24 may be based on a misunderstanding of what I said. To determine which of two cultures in conflict constitutes the greater danger to this country we should require a political and economic analysis too extensive for your pages and more related to personal opinion than to sociology. What I said was that, in the context of the hydrogen bomb, the present attitude-patterns of American society seemed to me more dangerous than those of Communist society, and what I implied was that the risk of a "deliberate mistake" by the military and political authorities of the United States is a danger to be reckoned with on psychological grounds.

I do not base this view upon political preferences, but on the opinion of a number of American sociologists, who regard the present developments with grave concern. Lewis Mumford, for example, recently wrote[1]: "If as a nation we have become mad, it is time for the world to take note of that madness. If we are still humane and sane, then it is time for the powerful voice of sanity to be heard once more in our land." There might well be Russian sociologists who would express themselves equally forcibly about aspects of the Russian attitude (if they were allowed to), but the evils they denounced would not be the same. A criminologist would say that the "modus operandi" of this particular form of delinquent behaviour, which bears a very close resemblance, I think, to the psychology of individual suicide, is not characteristic of the Communist societies, though they have plenty of others of their own. As Mumford points out, we are clearly entering the field of aberration when a people, or a section of that people, becomes convinced that the destruction of organised civilisation is a preferable alternative to the success of an opposing political system.

The development of atomic weapons is itself largely responsible, in the view of many American psychologists, for the development of these attitudes. In the words of Mumford once more, "Our need for secrecy . . . has produced pathological symptoms in the whole body politic—fear, suspicion, non-coöperation, hostility to critical judgment, above all delusions of power based on fantasies of unlimited extermination." The butt of the atomic weapon is considerably more dangerous to any society whose standards, like those of the vast majority of Americans, are humane and liberal, than is the muzzle. Any community which violates its own mores is liable to demoralisation, and the degree to which it is demoralised will be predictably greater in proportion to the sense of guilt which this departure engenders. It is upon these grounds, as well as upon the testimony of psychological observers whose opinions we dare not ignore, that I consider that there is in official America today a pressure towards self-destruction as an emotional release, which is probably absent from the Communist societies, and is certainly an acute danger to Western survival. To assert my independence from the propaganda of both camps in making this judgment ought, perhaps, not to be necessary. It is hard to see how, in the Cold War, a medical sociologist could be other than a neutral.

Loughton, Essex. ALEX COMFORT.

SIR,—Dr. Stafford-Clark states that "it is a matter of historical fact that it was the United States who proposed, and still propose, international control of the production and development of atomic weapons, while the Soviet Union have consistently refused to accept such control." Since the beginning of the Cold War, it has been an effective line of propaganda to disseminate the idea that the Soviet Union has put obstacles in the way of the banning of atomic and similar weapons of mass destruction. This propaganda has succeeded in misleading many people and increasing international tensions.

In order to remove misconceptions on this important subject, Science for Peace has just issued a pamphlet[1] giving a tabulated analysis of the U.S.A. and U.S.S.R. proposals made at the U.N. Atomic Energy Commission, and of their respective objections to each other's proposals. Russia objects that the U.S.A. plan does not prohibit manufacture. But it will be seen that the differences separating agreement are less than many of us have supposed. Given the will, these differences can be surmounted, thus paving the way to the accommodation between nations that you, Sir, and your correspondents have urged.

London, N.W.3. P. D'ARCY HART.

SIR,—It is difficult for those of us engaged in the daily practice of medicine to know how most effectively to add our small voices to what should become a gigantic outcry against not only the atom, hydrogen, and cobalt bombs, but against the whole silly but iniquitous and monstrously tragic business of war.

There are, however, approaches open to us. First we can attempt to influence our profession, public opinion, and eventually our leaders by every channel open to us; and I include in such channels conversations with colleagues over the lunch table, association with anyone (be they conservative, liberal, socialist, or even communist) who is willing to sit down and discuss the problem of preventing war, as well as letters to the lay and medical press. I welcome therefore your thoughtful and impressive leader of April 17, and hope you will keep your column open for what should be a spate of letters about "the bombs."

Professor Haddow, in his letter to the *Times* to which you referred, suggests a *concilium* of world science, representative especially of physics, chemistry, biology, and medicine, which would have "an unimpeachable primary loyalty to humanity as a whole." There could, incidentally, be no more appropriate phrase to guide what is, or should be, the attitude of our profession in all countries to the bombs, and to war generally. As a second effective step we can, by our meetings and conferences, foster within our own profession the kind of international atmosphere in which such a *concilium* could thrive. I doubt whether parties on officially sponsored visits of good will have much further value. But we could meet our colleagues from eastern Europe and Russia in the same spirit as we do those from western Europe and the Americas; not so much, perhaps, at big international conferences, which often breed international rivalry, as at smaller, more intimate meetings in branch subjects of medicine like pædiatrics, public health, midwifery, and so forth. As a by-product of quietly pursuing our own business, there can arise at such meetings a flow of friendly feeling which, in terms of international scientific relations, is worth any number of planned welcomes and visits of good will.

You rightly stressed that, as a first step to a return of human relations, the east and west should call a halt to aggressive propaganda. I submit that this term includes the letting off of bombs at tactical moments, to say nothing of threats, overt or thinly veiled, to use them in earnest; and we have a right as well as a duty to ask that all such posturings, however defensive, should be indefinitely abandoned by both sides.

London Hospital, E.1. RICHARD H. DOBBS.

1. *New York Times*, March 28, 1954.

1. The Control of Atomic Energy. Issued by Science for Peace, 16, Ulster Place, N.W.1, London. 4*d*.

GLUCAGON-FREE INSULIN FOR INSULIN-SENSITIVITY TESTS

SIR,—The work of Himsworth [1] on insulin sensitivity has often been considered as a means of classifying diabetics. Somogyi [2] has pointed out that the usual insulin-tolerance tests do not adequately measure sensitivity, since a fall in blood-glucose below the fasting level rapidly sets in action mechanisms that mask the response to insulin. Moreover, in crystalline insulin now available in the U.S.A. and Canada, the uncertain persistence of the hyperglycæmic-glycogenolytic factor (glucagon) makes it impossible to estimate the initial effect of the beta-cell hormone, for it delays the onset of the fall in blood-glucose level (the "latent period" of Himsworth) and affects the subsequent rate and regularity of fall. Probably the interfering glucagon has prevented workers in this hemisphere from finding a practical application for Himsworth's work.

With glucagon-free insulin intravenously in small doses (1–3 units), it is possible to show the immediate effect of insulin before the fall in blood-glucose can excite counter-measures. This beta-cell effect is shown by blood-glucose readings at 2, 4, and 6 minute intervals after insulin has been given. Thereafter, the glucose curve levels out towards its nadir, which usually occurs within 30 minutes of the insulin injection; thus, it is the response to hypoglycæmia rather than to the beta-cell hormone that is recorded in the 30-minute test. During the first 6 minutes after the insulin, only those factors actually operating in the body at that particular time can prevent or delay the onset of hypoglycæmia or reduce the rate of fall of blood-glucose.

Our findings in 100 unselected diabetic patients support the prevailing view that there are factors which counteract the effect of insulin and create a relative deficiency of insulin, and so produce diabetes. In insulin-sensitivity tests, every effort is made to minimise any suprarenal effects, so it is likely that other anti-insulin factors are responsible for keeping up the blood-glucose.

In a group of non-obese, non-diabetic medical students and nurses there was a prompt fall in blood-glucose to 6–25% of the fasting level within 6 minutes of giving glucagon-free insulin. In the obese adult diabetic, before the start of clinical treatment, there was usually little or no fall, or even a pronounced rise in blood-glucose after insulin. The juvenile diabetic at any age showed a prompt fall of blood-glucose level to within the normal range or lower, and the rate of fall was greater than normal. A third pattern was seen in the labile or so-called "brittle" type of diabetes in which the initial fall was extremely great and sudden, and was followed by a prompt rebound, often to well above the fasting level.

With effective dietary treatment and loss of weight, the poorly sensitive individual can often be made normally sensitive to insulin. In the juvenile type of diabetic, excessive weight, or a rapid gain in weight, often goes with the declining response to insulin.

Several applications of the 6-minute insulin-sensitivity test are possible. It can usually differentiate clinical types of diabetes and so help in treatment: the poorly sensitive obese adult diabetic can often be made sensitive to insulin by reducing his weight (with or without insulin). The test can determine whether the normal blood-glucose levels produced by treatment are merely an artificial improvement resulting from a forced stoichiometric mass effect of extrinsic insulin on blood-glucose, or a real improvement in the patient's *ability to respond* to insulin from within or without. It gives us a simple clinical laboratory method of making this distinction. Research is in progress to verify the suggestion that excessive doses of extrinsic insulin may decrease sensitivity to insulin.[3]

Obese adults in a diabetic family may show normal fasting blood-glucose levels and normal glucose tolerance but poor sensitivity to extrinsic insulin. In these so-called "normals" the 6-minute sensitivity test will provide a more delicate index of impending clinical diabetes than does the usual glucose-tolerance test or the postprandial blood-glucose level. The latter tests show abnormal results only after some reduction in carbohydrate tolerance has already taken place.

I suggest that the 6-minute sensitivity test may be a useful tool in exploring the problem by identifying potential diabetes.

State University of New York College of Medicine, New York City. GEORGE E. ANDERSON.

1. Himsworth, H. P. *J. Physiol.* 1934, **81**, 29; *Clin. Sci.* 1935, **2**, 67.
2. Somogyi, M. *J. biol. Chem.* 1949, **179**, 217.
3. Evans, M. A., Halst, R. E. *Amer. J. Physiol.* 1951, **167**, 176.

THE PLIGHT OF SENIOR REGISTRARS

SIR,—Much has been said and written about the plight of senior registrars. To Officialdom they must appear as pawns, to be dealt with as quietly as possible. There also seems to be a united psychological approach to them—by agreeing with all they have to say!

What seems to be forgotten is that they are human beings with a responsibility to their families. As wives, we have stood by whilst they have taken higher qualifications when the competition has never been so great nor the standard so high. We claim no reward for this, although it has not been easy for us; but now we are led to believe that years of responsibility and experience, together with these once prized qualifications, are valueless.

Our standards of life have been such that a lay person recently asked me if my husband would soon be qualified, and was somewhat taken aback to learn that this had happened over thirteen years ago.

We are educating our children as best we can, and a poor best it is compared with our own education; but the price of education has doubled since we were at school. Their future is also staked in this mad world.

Many wives have delayed having children until they could have some settled future and not have to be charwomen, cooks, laundrymaids, and kitchenmaids rolled into one; but in a few years they will be too old.

Worst of all to bear is the hopelessness and the strain, and one wonders how long these men and women can keep going before they break.

Surely these men are worth more than makeshift jobs in a country that is crying out for clinical skill? Has the medical world lost its conscience and sense of responsibility towards its brothers?

SENIOR REGISTRAR'S WIFE.

REMUNERATION OF HOSPITAL MEDICAL STAFF

SIR,—Much is being said and written about the importance of the battle against tuberculosis. Under the World Health Organisation, millions of children are being vaccinated against this disease. Important memoranda urging review of the campaign against tuberculosis are being issued by the Ministry of Health. The propaganda of the National Association for Prevention of Tuberculosis carries the fight to the remote corners of the Commonwealth. In England surely one will see every available weapon brought to bear by men of high skill and rare endeavour. But no! In England much of the anti-tuberculosis work is done by disgruntled senior hospital medical officers, whose status has been further lowered by the recent salary increases for hospital staffs. What is the reason for this inconsistency?

Hampshire. H. S. FRASER.

SIR,—Dr. Gray, in his letter of April 24, states that he is pleased with the recent award to hospital medical staff, though so many of his colleagues feel that it is not enough.

In referring to his income of £600–800 per annum as a tuberculosis officer in 1941, and contrasting this with his present rate of remuneration of £1500–1950 per annum as a senior hospital medical officer, he makes the remarkable statement that this constitutes "a betterment factor of 150%." Dr Gray presumably regards this as a satisfactory state of affairs, but I would ask him to consider, by the same token, the position if, in 1941, he had been in receipt of a slightly higher rate of salary—say £840–1240 per annum. Applying the betterment factor of 150% the rate of remuneration would today amount to £2100–3100—the salary of a consultant without a merit award.

Casting our minds back a little over six years to May, 1948, the Spens report defined the salary of a consultant as £1500–2500 per annum in terms of the 1939 value of money. Let us, however, ignore any increase in the cost of living or depreciation in the purchasing power of the pound between 1939 and 1941, and apply to the Spens scale the betterment factor which Dr. Gray considers to have been applied in his case. The 1954 scale for whole-time consultants becomes £3750–6250 per annum. If this were the case, no doubt Dr. Gray would find that his colleagues shared his enthusiasm over the recent award. In fact, those who were in receipt of a salary of £375–625 per annum in 1941 would possibly feel sympathetically disposed to the S.H.M.O. with a betterment factor of only 150%, compared with 1000% for his consultant colleagues.

The Chancellor of the Exchequer was asked in the House of Commons on April 6 what would be the pre-war equivalent purchasing power of a married man with two children now earning an income of £5000 per annum. The answer given was £1090 per annum. Dr. Gray's present income has therefore the 1941 equivalent of £500–625 per annum, so that after thirteen years' further service he is in fact rather worse off financially.

Plastic and Jaw Unit,
Basingstoke,
Hampshire. N. L. ROWE.

RADIOACTIVITY OF TOBACCO AND LUNG CANCER

SIR,—I was very interested to read the letter[1] from Professor Spiers and Professor Passey. They believe that there is little or no radioactivity in cigarette-smoke, though their findings for tobacco ash are roughly comparable to my own. I have recently tackled the problem from another angle: instead of testing the cigarette-smoke with a Geiger counter, I have estimated its potassium content; as there are 11 parts of radioactive potassium in 100,000, the results can be compared.

The smoke was sucked through a series of tubes containing 0·01 *N* HCl, and the resulting solutions were tested for potassium. A control test on the laboratory air was made on another day. Analysis of the solution showed that there was 300 μg. of potassium in the smoke of 20 cigarettes, or 15 μg. per cigarette, compared to 150 μg. in the laboratory air. These estimations were made by means of a flame photometer, and, as the margin of error could only be very slight, it is a reasonable assumption that they show an appreciable amount of potassium in cigarette-smoke.

The amount of cigarette-smoking that some authorities consider necessary to produce a neoplasm is 20 cigarettes daily for 20 years; in other words, a daily intake into the bronchial tree of 300 μg. of potassium. The dosage is, of course, extremely minute, but it is a surface dosage additional to that mentioned by Professor Spiers and Professor Passey—namely, the dosage received by the tissues from their normal potassium content.

Very little appears to be known of the effects of long-continued radiation of very low intensity. Many support the view that it is possible for a neoplasm to be initiated by low-intensity radiation spread over a very long period of time. The possible effect of potassium cannot be ignored, for it is the only naturally occurring radioactive element that gains entrance not merely to the cytoplasm of a cell but to its very nucleus, at which site, most observers believe, malignant changes begin.

Could not the active beta-radiation of K^{40} in a cell undergoing abnormal mitosis—e.g., in areas of chronic irritation or in involuting glands—be a factor in the initiation of a cancer? The storage of potassium in the body is almost completely intracellular, and it may be, therefore, that, in people who are on a high-potassium diet during their whole life, the intracellular content of potassium is greater than normal. This hypothesis is supported by the fact that, if large doses of potassium are administered, it is some two or three days before the excess is fully excreted. Also, the ratio of K^{40} to K^{39} and K^{41} in human potassium is not necessarily constant. Variations have been reported, and it can be envisaged that factors at present unknown might result in an increased concentration of K^{40} in the cell cytoplasm. It is well known that a tumour grows much more rapidly in the presence of abundant potassium; indeed, the potassium content of a tumour is higher than that of normal tissue.

1. *Lancet*, 1953, ii, 1259.

London, W.1. D. K. MULVANY.

TREATMENT OF DEAFNESS

SIR,—I was interested to read, in your issue of April 24, the letter by Mrs. Chadwick, a member of the Ardente Audiotherapy Unit. I must have worded my own letter badly if I conveyed the impression that I did not realise the tremendous value of auditory training. It is universally recognised that this is essential for all persons issued with a hearing-aid; it is given in many centres and also by several well-known hearing-aid firms as a part of their after-sales service. My motive in writing was to raise certain points.

Auditory training *without* hearing-aids, though it may be very useful in children learning speech and vocabulary (and should always be used for them), is not yet proved to be of value in adults by improving hearing for any reasonable length of time, other than through a physical ability to hear better.

In spite of Mrs. Chadwick's assertions, I consider that most authorities are not yet satisfied that true organic "cortical or central" deafness does occur. Abnormal auditory imperception needs fuller investigation before it can be established that this is not a lack of listening or concentration ability. (I am not considering here "word-deafness.") It is a well-known fact that psychological improvement can and does occur, either with training or as a result of such events as a fenestration operation, often to a remarkable degree; I agree with Mrs. Chadwick that the "social adequacy index" is useful to assess this improvement.

Hearing-aid firms, whether actual manufacturers or subsidiary vendors, are not necessarily correct in advocating re-education methods for those not deaf enough to need hearing-aids. Aural surgeons will be pleased, even thrilled, with any type of help that the hard-of-hearing can derive from any form of treatment or training; but a psychological, as opposed to a physical, improvement is one so easily gained by many anxious, handicapped persons that "commercialised" training seems open to question.

It is this point that I wish to stress; that further investigations are needed before this aspect of auditory training is accepted. The claim that all types and degrees of deafness improve almost equally must surely be open to investigation also.

It seems a pity that the American otologist working with and for a hearing-aid firm has declined an offer to attend a meeting of British otologists to describe the system advocated in his book and practised by the firm's "re-education unit."

London, W.1. IAN G. ROBIN.

ADMINISTRATION OF PENICILLIN

SIR,—The comment in your annotation of April 24, that "repeated injections . . . in children should be avoided if possible," prompts me to say that for the last six years I have ordered all injections of penicillin to be given subcutaneously rather than intramuscularly. I started this method after an interchange of letters with Sir Alexander Fleming, and those who will adopt it will find that it is relatively painless to all patients. In this way, penicillin can be administered by any intelligent person—for example, a school matron. The method is particularly suitable for children, who will more readily accept three or four subcutaneous injections a day by a small needle. Moreover, by this route the penicillin is more slowly absorbed, and I have never seen an anaphylactic reaction.

Broadstairs, Kent. MARTIN O. RAVEN.

HÆMOLYSIS AND ECLAMPSIA

SIR,—In your annotation of April 17 you examine the data of 3 unusual cases of eclampsia,[1] complicated by hæmolysis and by a derangement of normal hæmostasis. In the absence of any ascertainable cause, an immunological reaction was thought to be responsible for both abnormalities.

The fact that 2 out of the 3 patients died suggests either a very severe toxæmia or a complicating factor. The authors of the paper discussed both thrombocytopenic purpura and lupus erythematosus in this connection, and could not exclude the latter satisfactorily.

You emphasise the significance of hæmolysis in the ætiology of eclampsia, especially from the evidence provided by these 3 cases. For, if your second paragraph is germane to the argument, you must be held to imply that pigment casts in the collecting tubules of the kidney are the products of hæmolysis alone and that their presence in fatal eclampsia, fatal accidental hæmorrhage, or fatal obstetric injuries cannot otherwise be explained. But such pigment casts can be experimentally produced when intermittent and frequent electrical stimulation of the renal nerve evokes cortical ischæmia.[2]

In discussing the failure of hæmostasis in these cases, you cite certain experiments in which trauma of the placenta led to fibrinogenopenia, which has also been demonstrated in patients with eclampsia or with retroplacental hæmatomas. In the same context and notwithstanding the fact that fibrinogenopenia was *not* evident in these 3 cases, you suggest that placental damage could have been the cause. Others, besides myself, must reject this inference as unproven from the facts.

There are certain possible explanations for hæmolysis, other than those you suggest.

A mild hæmolysis is often found in the puerperium, and an exacerbation of this apparently normal happening may have occurred coincidental with the mounting toxæmia. It should be noted that, in 2 of the cases described by Pritchard et al.,[1] there was "a slightly increased erythrocyte osmotic fragility."

Employing purely physical methods for effecting the transfer of water, Hamburger has provoked a visible increase in the hydration of cells.[3] In the intact animal, equivalent methods have resulted in an electro-encephalogram similar to that found during epileptic convulsions [4] and presumably due to increase in the water-content of the brain cells. Cellular overhydration could be a possible cause leading to hæmolysis in pregnancy and to the onset of eclampsia. Loss of fluid from the plasma could prove a sequel, explaining hæmoconcentration [5] in severe toxæmia.

So far, in toxæmia, an increased electrolyte concentration in the cell (e.g., the red blood corpuscles) compared to the extracellular fluid (e.g., the plasma) has not been shown to exist, and the cause for a possible overhydration of the cell must be sought elsewhere. Recently Lambiotte-Escoffier et al.[6] produced "data to suggest that pre-eclampsia and possibly other abnormal pregnancies are characterised by increased intracellular penetration of sodium and water." They have made reference to the work of Gaudino and Levitt [7] to explain the redistribution of water and sodium from extracellular to intracellular space under the influence of cortisone, corticotrophin, and deoxycortone acetate. I have discussed [8] certain difficulties in correlating their findings. Transfer of electrolyte and water from cell to extracellular fluid and in the reverse direction could occur during cation-exchange-resin treatment in resistant toxæmia and its repetition could damage the red blood corpuscles and explain the hæmolysis in the case described by Baker et al.[9]

The rarity of hæmolysis and disordered hæmostasis in eclampsia is against their being of primary ætiological significance. They appear to be incidents grafted on the central and essential problem of water retention.

London, W.1. JOHN SOPHIAN.

ESTIMATION OF DINITRO-ORTHO-CRESOL IN BLOOD

SIR,—The measurement of dinitro-ortho-cresol (D.N.O.C.) in the blood is a very important procedure for the prevention of D.N.O.C. poisoning in farm-workers or, more especially, contract-spraying operators using this poisonous spray chemical. By this means, it is possible to demonstrate whether, at the time of sampling, the worker's absorption of the chemical was trivial (1–10 μg. D.N.O.C. per ml. whole blood), appreciable (10–20 μg. per ml.), unsafe (20–30 μg. per ml.), likely to cause some toxic effects (30–40 μg. per ml.), dangerously high (40–50 μg. per ml.), or critically dangerous (over 50 μg. per ml.). Only by knowing the blood D.N.O.C. level is it possible to keep occupational exposures within safe limits, to study the safety of different working methods, or to confirm or refute the diagnosis of suspected D.N.O.C. poisoning in a sick spray operator.

The analytical technique of Parker [10] and its modification to a micromethod by Harvey [11] both involve the use of a photo-electric colorimeter and calibration curve. The standard of accuracy thus sought, although of value for special investigations, is not really necessary either for routine or emergency analyses. An inaccuracy of perhaps 5 μg. per ml. is acceptable in a method which offers simplicity, speed, and ready availability outside the clinical laboratory. With this in mind, a more simple procedure has been developed.

1 ml. of the blood sample is added to 5 ml. of methyl ethyl ketone and, after adding about 1 g. of a mixture of 9 parts sodium chloride/1 part anhydrous sodium carbonate, is *vigorously shaken for thirty seconds*. (The solvent extracts the D.N.O.C. from the blood almost completely, and at blood D.N.O.C. levels over 10 μg. per ml. will be visibly yellow.) The solvent extract is now filtered free from blood coagulum and particles, and compared in a standard comparator with a series of nine permanent standards ranging from 5–45 μg. D.N.O.C. per ml. whole blood, either in good daylight or in reflected white light. The blood D.N.O.C. content can then be "read off" to the nearest matching disc, in terms of μg. D.N.O.C. per ml. whole blood.

The results obtained by this method are within 4–5 μg. per ml. of the blood D.N.O.C. levels as determined by the absorptiometric techniques, which usually give the higher result. The whole procedure of venepuncture and D.N.O.C. estimation can by this method be carried out

1. Pritchard, J. A., Weisman, R., Ratnoff, O. D., Vosburgh, G. J. *New Engl. J. Med.* 1954, **250**, 89.
2. Sophian, J. Toxæmias of Pregnancy. London, 1953; p. 123.
3. Hamburger, J., Mathé, G. Métabolisme de l'eau. Paris, 1952 p. 83.
4. *Ibid*, p. 305.
5. Dieckmann, W. J. Toxemias of Pregnancy. St. Louis, 1952.
6. Lambiotte-Escoffier, C., Moore, D. B., Taylor, Howard C. jun. *Amer. J. Obstet. Gynec.* 1953, **66**, 18.
7. Gaudino, M., Levitt, M. F. *J. clin. Invest.* 1949. **28**, 1487.
8. Sophian, J. *Amer. J. Obstet. Gynec.* 1953, **66**, 1369.
9. Baker. W. S. jun., Baker, J. P., Lussy, W. J.. Bancroft, C. E., Clairbone, H. A., Lehman, J. J. *Ibid*, p. 842.
10. Parker, V. H. *Analyst*, 1949, **74**, 885.
11. Harvey, D. G. *Lancet*, 1952, **i**, 796.

within a very few minutes, with an accuracy which is quite satisfactory for most purposes. The extraction and estimation techniques serve equally well for the measurement of dinitro-butylphenol, another toxic chemical used for controlling weeds in peas, beans, and other legumes. If, for any reason, plasma or serum is used instead of whole blood, the measurements will be approximately twice as high as the whole-blood levels, since the vast majority of the chemical is held in the plasma, with little in the cells.

The comparator and special 'D.N.O.C.' disc are available from Messrs. Tintometer Ltd., Waterloo Road, Salisbury.

Pest Control Ltd., Cambridge. E. F. EDSON Medical officer.

HOSPITAL, DOCTOR, AND PATIENT

SIR,—May I crave a little more of your valuable space to enter the arena again?

Mr. King (April 17) is acting with admirable intention and no doubt in his hospital it works. But may I ask what steps he, or the management committee, take to inform the parents of his availability for interview? Is it printed on the admission note?

Patients have a great fear of authority, and particularly when it is shrouded in the grand mystery of imposing hospital buildings. I am sure a parent would not ask a sister for this privilege (if privilege it is) unless directly guided to do so.

Secondly, is the sister always on duty at visiting-time? During my recent stay as a patient in hospital, visiting-hours were often manned by junior staff. Are they allowed to conduct a policy other than that of "sealed lips"?

Thirdly, how many of *us* take up an opportunity for an interview, or write about our queries? This universal lassitude, or desire not to give trouble, is, I think, a national characteristic and may account for the fact that many ill-conducted dirty surgeries (do not think I condone them) are still beloved by the patients, because there they can always find their doctor without appointment and can talk to him without prior notice of their queries.

York. F. CHARLOTTE NAISH.

MEDICAL TERMS

SIR,—In your review last week you seem to have completely misunderstood the purpose of this book. Owing to the accidental omission of a "t" in "ballottement" and other "small errors" the reader is *warned* "that he is being addressed by a fellow doctor rather than a professional philologist." If this warning is intended to convey that the reader must not expect philological perfection I am grateful, though I have yet to learn that works by professional philologists are invariably free from minor errors. But since you evidently imply that a "fellow doctor" is unqualified to write on the subject I must beg to differ. It is just because no professional philologist has attempted the task that I have stepped in, though fully conscious of my limitations, where angels have been too superior to tread.

You sneer at the book because it is "designed on an elementary level." Perhaps you will condescend to tell me from your Olympian heights on what other level it should have been designed? Recollection of my student days and a lifetime's experience of students, nurses, and auxiliaries have forcibly impressed upon me the confusion and difficulties arising from their ignorance of the meaning of words. One student, at his Final Examination at one of our older universities, had no idea why the lingual artery was so called. Nor are some of their instructors in better case. One of them, a consultant of high standing, was astonished to learn how "cyanosis" was constructed.

It is to such as these—the common people if I may be allowed without offence to call them—that the book is addressed by one of their number. I do not claim to be anything better than a verbal social worker or missioner in the linguistic slums in which I was myself reared, and which have been created not by any fault of the inhabitants but by the over-population of scientific terms. Those precious and delicate minds who have "any considerable knowledge of words" and who are "sensitive to inaccuracy" (even to trifling misprints) should shun the book like the plague. I have certainly no wish to cause them pain. But Heaven help us from clever people!

My derivation of "anaphylaxis" is linguistically correct. If Richet coined the word for the sake of euphony (which you seem to approve) all I can say is that were this example to be generally followed the language of medicine would soon degenerate into the nomenclature of modern drugs and detergents in which a higher commercial value naturally attaches to euphony than to sense. You would no doubt be delighted at such an outcome; I should regard it with dismay. If my modest contribution to the subject does something to prevent such a consummation I shall feel that I have not written it in vain.

Chesham, Bucks. FFRANGCON ROBERTS.

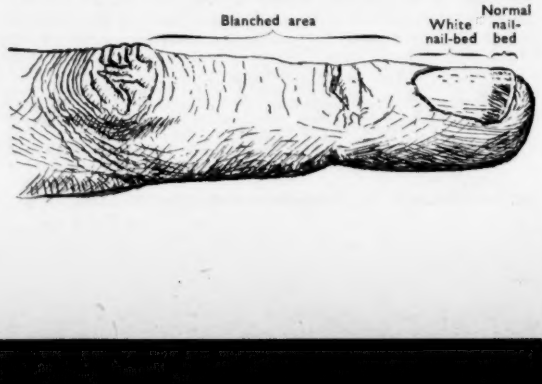
WHITE NAILS

SIR,—Dr. Terry's extremely accurate and detailed description (April 10) of white nails in hepatic cirrhosis is of particular interest to me, because I have been closely observing what I assume to be a similar phenomenon in a man of 79 with a grossly dilated heart, angina, and cardiac failure, following myocardial infarction in 1938.

I had been treating him for severe and intractable angina at rest (though there was no electrocardiographic sign of recent infarction) and early cardiac decompensation (there was little indication of it but fine râles at the bases) since last September, when I was horrified to notice, on Feb. 15, the deathly pallor of all but the terminal 3–4 mm. of his finger-nails (see accompanying sketch). There was also striking blanching of the skin on the dorsum of the fingers distal to the proximal interphalangeal joints, and several scars on the forearms stood out startlingly white against the rather dusky surrounding skin. It may have been the gas-light that emphasised these features. Despite their appearance, his fingers were perfectly warm, and his conjunctivæ belied their suggestion of anæmia. His pulse volume was fairly good, and his hæmoglobin I found next day to be 13·2 g. per 100 ml.

Now that he is no longer in failure, the nail-beds remain as white as they were, though the skin has resumed its normal hue, and, as far as I can make out in the presence of onychauxis, his toe-nails are similarly affected. There is no abnormal ridging of the nails; and, although his liver was admittedly tender and slightly enlarged at the height of his decompensation, there is no clinical evidence of liver damage now.

If this is the condition described by Dr. Terry, as I feel it must be, I cannot offer any hypothesis as to its cause, but I had assumed the condition to be a vascular one. It seemed to me that the arterioles, if not dilated, were certainly not constricted as in Raynaud's phenomenon, because the fingers were warm; similarly the



capillary bed appeared to be functioning normally except on the dorsum of the fingers. Can it be that the capillary bed in the proximal part of the nails (and perhaps in scar tissue) is unusually thin and that this area is pale because the deeper, reticular layer of the corium is abnormally pale? One can perceive, even in normal nails, a slight difference in depth of colour between the distal 3 mm. and the rest of the nail. And could it not be that the latter, being less well protected by a vascular coat, is the seat of that intolerable ache that occurs when one's fingers are thawing out? I advance this theory with great hesitancy, in the hope that, if it be foolish, it may enable someone else to get nearer the truth.

Kingston-on-Thames, Surrey. CHARLES STEER.

GRADUATE WIVES

SIR,—I have read with interest your annotation last week, and I would like to utter a few complaints about the way married women doctors are treated by the medical profession.

The fact is that part-time women doctors are just not wanted. I have tried unsuccessfully (as I know have many of my colleagues), in between bringing up a family, to obtain part-time employment in infant-welfare clinics—work for which I should have thought married women doctors were particularly well suited, having not only a medical qualification, but also personal experience in bringing up children. It seems, however, that the market is full to overflowing with full-time and part-time workers; and additional letters after one's name count for more than personal experience. To obtain additional qualifications, it is usually necessary to hold a resident post, which is an impossibility with a husband and family, who must come first, to care for.

I imagine the position is particularly difficult in the London area, owing to the larger proportion of graduate wives compared to other parts of the country. Another cause, I feel, is the large fees offered for sessional work; local authorities find it cheaper to maintain a full-time staff. Most married women doctors would be content to have a little pocket-money in hand after deduction of income-tax and after any additional domestic help had been paid for. So we might save the National Health Service a little of its vast expenditure.

London, S.W.15. MARY E. LENNOX.

REPAIR OF LARGE HERNIÆ WITH NYLON MESH

SIR,—I would like to add my appreciation of Professor Stock's article of Feb. 20. One or two details of technique may be of interest.

I first started using nylon when I was senior registrar to Mr. S. V. Unsworth in 1951, when pre-cut nylon material was being implanted. At my suggestion we used nylon tricot—the light self-locking material which is used for ladies' underwear. This is very much lighter than the nylon mesh used in shoes and is quite strong enough, as experience has proved. It is easily obtained from any fashion store; I am using pink tricot material now but the colour comes out with boiling for sterilisation. By using tricot, the graft can be cut to shape in situ. The approximate size is cut and one side anchored to the inguinal ligament; I myself use continuous braided nylon thread, the most important stitch being the one bringing the graft down to the pubic bone. The upper edge is stitched with the graft laid in place, and an estimate can be made of the required tension, then the excess of material is cut away, the graft being thus tailor-made.

In regard to the ring, I make a slit in the nylon from the outer edge, which enables me to sleeve the cord, instead of having sharp edges as may occur with Professor Stock's method. I have used this technique in Fiji with all large herniæ and have had no sepsis. At first I gave 1·5 mega units of procaine penicillin but I have found this unnecessary. I agree that it is ideal material for incisional herniæ, and I feel sure that it would be excellent for closing a diaphragmatic hiatus.

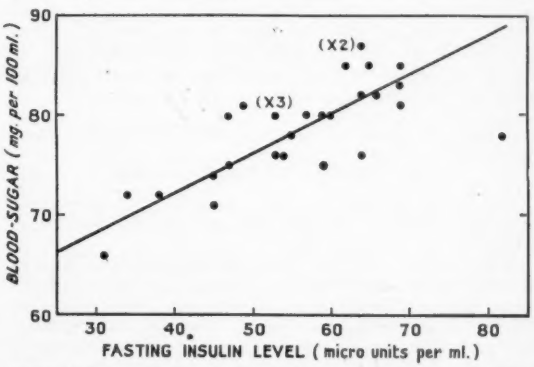
At this distance, I am not able to confer with Mr. Unsworth, of the Royal Liverpool United Hospital, but I would like to thank him for his very large part in the development of this method while I was his senior registrar.

Colonial War Memorial Hospital, Suva, Fiji. ROBERT I. COHEN.

ESTIMATION OF PLASMA-INSULIN

SIR,—We should like to thank Dr. Edwards for his critical letter (Feb. 6) on our paper which appeared in your issue of Jan. 9.

Our data have now been reconsidered and further work has led to changes in the method of calculating the results, without, however, altering our general conclusions. While a full account of the revised method



Insulin levels in normal fasting subjects (recalculated) indicating the apparent relation between these values and their corresponding blood-sugar levels.

will be published elsewhere, we wish to make the following comments.

We did not make it clear in our paper that the values were calculated on linear scales between 10^{-5} and 10^{-4} and between 10^{-4} and 10^{-3} units per ml. of insulin. It has now been found by taking intermediate values that the graph of glucose uptake against the insulin concentration is curvilinear at the above concentrations. There was still an apparent curvature when the insulin values were plotted logarithmically. It now appears that a better approximation to a straight-line relationship over the required range, 10^{-5} to 10^{-3} units per ml. of insulin, is obtained by plotting glucose uptake against the cube root of the insulin concentration.[1] We have recalculated our results and find that the fasting insulin values fall between 31 and 82 micro-units per ml.; there still appears to be a direct relationship to their corresponding blood-sugar levels as previously suggested (see accompanying figure). The standard error of the deviation about the line was 14%. In recovery estimations, when known amounts of insulin are being estimated, the standard error of the percentage discrepancy was 21%. But we are here dealing with the difference of two estimations, each of which is subject to variation and the standard error of the difference would be expected to be greater than the standard error of either estimation separately.

To reply to the criticism that insulin was not being measured in the fasting state, we have carried out the following experiment.

Blood was taken from a fasting male subject, who was then given soluble insulin intravenously (0·1 units per kg. body-

1. Finney, D. J. Statistical Methods in Biological Assay. London, 1952.

weight); a further sample of blood was removed twenty minutes later, by which time the subject felt hungry and was perspiring. The blood-sugar and the plasma-insulin levels were estimated in each sample. In the fasting state the blood-sugar was 84 mg. per 100 ml. and the plasma-insulin 64 micro-units per ml.; twenty minutes after intravenous insulin, the blood-sugar had fallen to 30 mg. per 100 ml., whereas the plasma-insulin had risen to 400 micro-units per ml.

This experiment, together with the previously reported inhibition of the insulin effect by cysteine and glutathione, strongly suggests that what is being estimated in the fasting state is the effective plasma-insulin concentration.

J. VALLANCE-OWEN
BARBARA HURLOCK
N. W. PLEASE.

Postgraduate Medical School of London, London, W.12.

TREATMENT OF CONVULSIONS IN CHILDHOOD

SIR,—Because of its efficiency and comparative safety, intramuscular paraldehyde is being widely used in hospital practice in the emergency treatment of continuous convulsions in children. When, however, a small quantity of hyaluronidase solution is thoroughly mixed with the paraldehyde just prior to injection, it will be found that the beneficial effect is extremely rapid in onset and that only a comparatively small dose of paraldehyde is usually required.

Hillingdon Hospital, Uxbridge, Middlesex. HARRY V. L. FINLAY.

TEXTBOOK ILLUSTRATIONS

SIR,—The standard of illustration in the new edition of a well-known textbook has led me to write this letter.

For a number of years the photographic departments of almost all medical schools and teaching hospitals have accumulated a considerable amount of clinical material. The black-and-white and colour photographs are filed and cross-indexed according to the names of diseases. While the records of any one department may cover only a limited number of conditions, each will have established comprehensive collections of the subjects which are of special interest to its hospital or institution. By courtesy of the consultants, these pictures are being made available to the medical staff of other hospitals. Authors and lecturers can thus, by consultation with their photographic department, obtain the best existing examples of the disease in which they are interested.

The search for the most suitable illustration would be facilitated by the formation of national or regional collections. Such libraries would receive 35 mm. lantern slides in colour or in black and white from their affiliated hospitals. This is the least expensive method of securing file copies, as most of the 35 mm. reversal black-and-white and colour films are bought at a price which includes the cost of processing. After exposure the cassettes are sent to the appropriate laboratories which return the finished transparent pictures.[1] The use of 35 mm. reversal film would therefore reduce the cost of preparing duplicates and require very little space for filing. The prospective author or lecturer would see all the available material in one central place. Once his choice were made he would be referred to the hospital which owns the original illustration. Such a collection should eventually include copies of diagrams, paintings, and radiographs, as well as photographs.

Until these libraries are established, reference to the nearest photographic department will help in the selection of the most suitable material for the illustration of lectures and textbooks.

Guy's Hospital Medical School, London, S.E.1. C. E. ENGEL.

1. Engel, C. E. *Med. biol. Ill.* 1954, **4**, 1.

PREVENTION OF AIRBORNE INFECTION

SIR,—I was a little surprised to read the letter by Dr. Williams and Dr. Lidwell in your issue of April 10. The details of their tests are known to me but the reasons for the failure are at present inexplicable. Your readers may be left with the impression that these results are a scientific refutation of an unsubstantiated claim—which is far from the truth. Dr. Williams and Dr. Lidwell do not mention the results of other workers.

Several thousand tests on hexylresorcinol aerosols have been carried out in these laboratories in the past fifteen years, using saliva and 17 species of laboratory cultures as test organisms. Naturally the results varied from one type to another, but with standardised conditions worthwhile kills were always obtained. Mackay's experiments,[1] carried out in a 16,500 c. ft. chamber, completely confirmed our findings and on a scale comparable with the size of rooms used in Dr. Williams's tests; admittedly, the test organism was not the same in the two cases. In the Medical Research Council's own report [2] resorcinol and alkyl resorcinols are listed among "... air disinfectants known at present and [which] appear outstanding" (p. 314); and "For the dispersal of disinfectant, vaporisers are usually most convenient ..." While the above examples may be regarded as referring simply to laboratory tests on a small or large scale, they cannot be ignored. On the other hand, success under operational conditions cannot be claimed on these grounds alone. My letter of March 6 suggested that continuous-flow aerosols of hexylresorcinol *should*, not would, prevent cross-infections.

From the practical point of view, support to the laboratory work has been given by Dickson,[3] who reports reduction of absenteeism and duration of morbidity among a large group of office-workers exposed to continuous-flow aerosols of hexylresorcinol. Further support is furnished by McGrath's experiences in the Dublin Zoo monkey-house.[4] Moreover, in the plasma-rooms of blood-transfusion centres, the contamination-rate has been considerably reduced since the aerosol system was introduced.

Altogether there is so much evidence in favour of continuous-flow aerosols that we feel there must be some explanation for the reported failure, and Dr. Williams and his team are best placed to suggest reasons. If some peculiar local conditions obtained, then it is important that these be known so that if they occur elsewhere steps might be taken to counteract them.

Avebury Research Laboratories, Goring-on-Thames. A. HOWARD BAKER.

HASHIMOTO'S STRUMA LYMPHOMATOSA

SIR,—If sought in the highways and byways, this fascinating condition is not as uncommon as is generally believed. The patient is usually a middle-aged or elderly woman with an abnormally firm, and therefore outlined, thyroid gland, which is often obviously enlarged; and there is evidence, both clinical and laboratory, of subthyroidism.

There is wide agreement about the histological changes in the thyroid—apart perhaps from how much fibrosis to allow before changing the name to Riedel's disease. These changes include diffuse infiltration with lymphocytes and plasma-cells, and the presence of well-formed lymphoid follicles. On the other hand, clinicians are far from unanimous about what they are looking for; Crile [5] mentions 50 patients (and other evidence suggests that these cases were collected over, at the most, a few years), but he dismisses Riedel's struma as "such a rare disease that for practical purposes it can be disregarded"; Spence [6] says that Hashimoto's struma is rarer than Riedel's, which itself is rare; and Simpson [7]

1. Mackay, I. *J. Hyg. Camb.*, 1952, **50**, 82.
2. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1948, no. 262.
3. Dickson, C. *Irish J. med. Sci.* Sept., 1953, p. 337.
4. McGrath, J. *Ibid*, p. 343.
5. Crile, G. jun. *Ann. R. Coll. Surg. Engl.* 1954, **14**, 3, 158.
6. Spence, A. W. Clinical Endocrinology. London, 1953.
7. Simpson, S. L. Major Endocrine Disorders. Oxford, 1948.

considers the condition very rare and only to be diagnosed at operation.

In this department, 8 or 10 cases (not all proved by biopsy) have been watched over the past few years, and in those treated steadily with oral thyroid extract the same diminution in size of the gland has been seen as was described by Crile, who now considers this the specific treatment instead of the hitherto widely practised thyroidectomy. It is strange that this simple treatment has apparently received scant attention, although Lerman [8] knew of it.

We have observed a persistent abnormality in the serum colloidal gold test, of which we have found no mention in case-reports. Curves of the order of 555554 and, in another case after a year on thyroid, 555410 have been obtained. Nothing comparable has been seen in the most florid "typical" myxœdemas. In one case, in which the remote possibility of amyloidosis of the liver and thyroid gland had been considered, the histological picture of a wedge of liver was normal.

This abnormal blood chemistry may assist in diagnosis; and if others have met it we shall be interested to hear their views.

Department of Pathology, General Hospital, West Hartlepool.

R. T. COOKE
E. WILDER.

TRICHOBEZOAR

SIR,—The article by Mr. Trafford in your issue of April 10 reminds me of a similar case operated on by Mr. C. Raison at Birmingham Children's Hospital in 1926. The girl, aged about eleven, was admitted with intestinal obstruction and was diagnosed as having a hair-ball on the story of her mother, who said she was always chewing her blankets. The obstruction was at the lower end of the ileum.

Folkestone. V. S. MITCHESON.

HEPARIN AND HYALURONIDASE

SIR,—I was interested to read Dr. Riley's paper (April 24) on the mast cells. A study of the literature on the relation between heparin, hyaluronidase, and collagen led to the following hypothesis which was put forward about a year ago.[9]

Heparin is known to be a powerful natural inhibitor of the enzyme hyaluronidase,[10] and serum contains a non-specific inhibitor of hyaluronidase.[11] The only tissue from which this inhibitor can be extracted is stated to be one rich in mast cells.[12] The level of this inhibitor in the serum has been found to be raised in "stress" states, in acute lupus erythematosus and rheumatic fever, after corticotrophin (A.C.T.H.) injection[13] and after operations in animals.[14] It is interesting to note that in many of these conditions the activity of heparin in preventing coagulation of the blood is diminished. This is so after operation and the administration of corticotrophin,[15] in rheumatic fever,[16] and in acute lupus erythematosus.[17]

It seems that these observations may be explained by assuming that the substance produced by the mast cells can act either: (*a*) as heparin, when combined with its co-factor; or (*b*) as hyaluronidase inhibitor, when combined with a lipoprotein.[12] This combination of heparin with a lipoprotein, thus diverting it from its anticoagulant activity, may be favoured by the adrenal cortical hormones. In this connection it is interesting to note that heparin,[18] salicylates, and cortisone all have a therapeutic action in rheumatic fever, and that salicylates are stated to have an inhibiting action on hyaluronidase, probably due to their stimulation of pituitary and adrenal activity.[19]

If the action of corticotrophin and cortisone in the collagen diseases is related to the inhibition of breakdown of hyaluronic acid and the above hypothesis is correct, one might expect, in some cases, a potentiation of the therapeutic action of the hormones if heparin were given simultaneously, an extra supply of part of the anti-hyaluronidase system thus being made available.

I am well aware that many objections to this hypothesis can be produced, but there is no room to discuss them in a short letter.

St. James's Hospital, Leeds, 9. J. V. GARRETT.

8. Lerman, J. *New Engl. J. Med.* 1952, **247**, 259.
9. Garrett, J. V. D.M. Thesis, Oxford University, 1953.
10. Swyer, G. I. M. *Biochem. J.* 1948, **42**, 32.
11. McClean, D. *J. Path. Bact.* 1942, **54**, 284.
12. Glick, D., Sylvèn, B. *Science*, 1951, **113**, 388.
13. Glick, D. *J. Mt Sinai Hosp.* 1950, **17**, 207.
14. Cole, J. W., Shaw, D. T., Fraser, P. *Surg. Gynec. Obstet.* 1950, **90**, 269.
15. Garrett, J. V. *J. clin. Path.* 1953, **6**, 294.
16. Abrahams, D. G., Glynn, L. E., Loewi, G. *Clin. Sci.* 1951, **10**, 1.
17. Borrie, P. *Brit. J. Derm.* 1951, **63**, 21.
18. Glazebrook, A. J., Wrigley, F. *Brit. med. J.* 1949, ii, 789.
19. Pelloja, M. *Lancet*. 1952, i, 233.

Parliament

Science to the Rescue

IN the House of Lords on April 28 Viscount SAMUEL drew attention to the rapid increase in world population and the consequent need to produce more food and raw materials. A hundred years ago the population of the world was 1000 million; today it was 2500 million; next century it would probably be 5000 million. The pessimistic school of neo-Malthusians held that the fertility of the human race was outstripping the fertility of the plant. Lord Samuel believed that this need not be so. He looked to science, which had brought about the danger, to bring about the means of averting it. If there were millions more mouths to feed—100,000 more every day—every mouth brought two hands to work, and if there was a stomach there was also a brain. Opportunities to extend the area of soil under cultivation were enormous, and those to increase its yield were even greater. For instance, by replacing draught animals by machinery immense quantities of food were released from animal consumption for human consumption. But the most important equipment on the farm was human labour, and in the tropics many workers were incapacitated by chronic disease. We could bring them health not only by providing drugs but by educating the women. Their homes were too often squalid and unhealthy, and he believed that the problem of Asia and Africa was largely a problem of the liberation and education of women.

Lord BOYD-ORR agreed that, if the present trend of population continued, we must double food production in the next 25 years, and nearly double it again in the following 25 years. There were two views on its feasibility. Some held that it was impossible and pointed to the food lost through soil erosion. Others held that with modern engineering and agricultural science it was difficult to set limits to the amount of food which could be produced. Even if land resources failed to produce enough the chemist could make food from sawdust. Protein could be produced from yeast and from algæ and other plankton. But though it was easy in theory to increase food, it was not so easy in practice. Social, religious, and economic difficulties stood in the way. He thought it might be a good thing if an informal committee of the House were set up to consider what might be done in the interests not only of this country but of the world.

Lord BEVERIDGE pointed out that the growth of population was due to death control. The saving of lives through the development of science had become one of the major factors in the world population problem. Was it not clear that death control automatically required in some form or another birth-control? Lord SIMON OF WYTHENSHAWE agreed that the problem facing the world was to help the people of underdeveloped counties to complete the cycle, as we in this country had, from the state of high births and high deaths to low births and

low deaths. When we had started death control two hundred years ago medical and sanitary science was in its infancy. In Eastern countries the death-rate was falling to Western levels in a few years and the people had no time to adapt themselves.

Lord HADEN-GUEST asked for a detailed survey of world conditions. People did not always act rationally; they did not take food because it had certain proteins and carbohydrates, but for all kinds of reasons. We also needed a more detailed survey of the world population, because some form of birth-control was a necessity, and it would be difficult to persuade primitive peoples to accept it.

Lord STAMP suggested that preventive inoculation, and other public-health measures, could be a mixed blessing to over-populated areas, if the end-result was to increase malnutrition and deaths from starvation. But the problem of feeding the world could be tackled from many angles and, as a medical microbiologist, he was particularly interested in the so-called unconventional methods of food production. Among some of these forward-looking developments he mentioned the suggestion that yeasts might be grown on industrial wastes such as molasses or on the hydrolysed products of wood pulp or of seaweed and used as accessory human food. This had already been done on a small scale in the West Indies. Another group of organisms which might serve as food for animal livestock were the algæ. These unicellular plants produced high yields of fats and protein of nutritive value when grown under controlled conditions on simple inorganic nutrients under the photosynthetic influence of sunlight or artificial light. Considerable progress had already been made in developing this idea on a pilot-plant scale both in this country and, even more so, in the United States. It was also possible that, as the result of genetic studies, the yield of substances of nutritive value might be increased by the selection of variant strains of yeast and chlorella. Another possibility was to use the photosynthetic action of sunlight to extract proteins from leaves of plants at present largely wasted, such as potato and beet tops. This process might be especially suitable in tropical countries where the photosynthetic action of sunlight was intense and vegetation was lush. Again, in Denmark progress had been made in harvesting plankton from the sea by an ingenious process of electrolysis, which attracted them to the surface of large metal plates. The Danes had also treated fish and other offal with cultures of bacteria, thus rendering it palatable to animals. The mass production of micro-organisms and chemical analysis of their products was likely to have wide applications. Some of these processes were already being used on a large scale for the production of antibiotics, such as penicillin, and also vitamins, such as vitamin B_{12}, which could not be synthesised commercially. By lowering costs of production they might substantially reduce the cost of the health service.

Earl DE LA WARR, postmaster-general, replying to the debate, said that the real problem was for agriculture to keep pace with medicine. But it could do so only by a great effort. Birth-control was primarily a matter for the countries concerned and then for the individuals concerned. He could not see India thanking us, or the United Nations, for teaching their people methods of birth-control. Turning to help that we could properly offer, he said that just under £1 million of F.A.O.'s £4 million income came from Great Britain and the Commonwealth. We were also sharing in the Colombo plan. In our own Colonial territories in 1953 the grants and loans for projects to increase production amounted to about £123 million, besides what the local governments in those territories were doing.

He would like to end on a hopeful, but not complacent, note. In 1950 it was estimated that world food production was falling behind the increase in the population, but two years later it had outstripped that increase. The increase in food production was not large, but it did show that the problem was soluble if it was faced. Her Majesty's Government were determined to make their maximum contribution internationally, but above all in this country and in the Colonies for which they were primarily responsible.

Committee on Homosexuality

On the motion for the adjournment in the House of Commons on April 28, Mr. DESMOND DONNELLY asked for the appointment of an royal commission on homosexuality. Sir ROBERT BOOTHBY thought that homosexuality in this country was more prevalent than was admitted and that it was tending to increase. All the laws relating to it were enacted before the discoveries of modern psychology. They were outmoded and they failed either to limit the incidence of homosexuality or to mitigate its evil effects. Youth must be protected, but there, in his opinion, the law should stop, and he believed that if it did so there would be at once a vast improvement in the existing situation. To send confirmed adult homosexuals to overcrowded prisons for long sentences was not only dangerous but madness.

Sir HUGH LUCAS-TOOTH, under-secretary of State for the Home Department, said there were no reliable means of assessing the prevalence of homosexual practices. The number of cases which came to the notice of the police and the number of convictions had increased. There would be general agreement that the criminal law ought to provide effectively for the protection of the young and for the preservation of public order and decency. The question was whether the law should confine itself to securing those two objects or whether it should be amended so as to permit unnatural relations between consenting adults in private. Such activities were no crime in many countries of the world today. The Home Secretary had received from the Cambridge Department of Criminal Science a report on a survey of all sexual offences reported to the police in 1947 in 14 police areas. It showed that 986 persons were convicted of homosexual and unnatural offences. Of these 257 were indictable offences involving 402 male victims or accomplices, as the case might be. Most of these victims or accomplices were under the age of 16. Only 11% of the whole were over 21, and there was only 1 conviction involving the case of an adult with an adult in private. These figures showed that the result of the law, whatever its intention might be, was not so very different from what Sir Robert Boothby had pleaded for.

Turning to medical treatment, Sir Hugh said that visiting psychotherapists had been appointed at certain prisons. Prison medical officers elsewhere submitted the names of any prisoners serving substantial sentences, whom they thought likely to benefit by treatment, for transfer to a prison where treatment was available. Prisoners serving shorter terms could be seen by visiting psychiatrists from regional hospital boards, and treatment was often started with a view to continuation after release from prison. The Prison Commissioners proposed to build a special establishment for mentally abnormal prisoners; sexual and homosexual cases would certainly be included.

Sir Hugh ended by announcing the decision of the Home Secretary and the Secretary of State for Scotland to appoint a committee to examine homosexual offences and the parallel problem of the law relating to prostitution and solicitation generally. The Home Secretary felt that a committee would be more appropriate than a royal commission, but he was anxious to secure the services of able and experienced men and women to serve on it. It might be some time before the membership and terms of reference could be announced.

Pay of Mental Nurses

In an adjournment debate on May 3 Miss PATRICIA HORNSBY-SMITH, parliamentary secretary to the Ministry of Health, announced the improvements in the remuneration of nurses and assistant nurses in the mental health service, recommended in the arbitration award, which are being submitted to the Whitley Council. The basic rates, she explained, are to remain unchanged, but the student mental nurse would receive an increase of £40 in total in the proficiency allowances payable on passing her preliminary and final examinations. By the time the mental student nurse reaches the end of her training she would thus have received £175 more in pay and allow

ances than the general student nurse, or nearly £60 a year. There would also be increases in dependants' allowances, and in allowances to married men. The new rates would increase the "mental lead" from £20 to £45, so that a qualified mental nurse would receive £45 more than her counterpart in the general hospital. The revised salaries would be £405 rising to £505 for women, and £415 rising to £515 for men. There were other and comparable increases for ward sisters and the like. The nursing assistant would start at £280 instead of £250, and after two years' satisfactory service she would advance to £335 and thereafter to the existing maximum of £425. Miss Hornsby-Smith added that the Whitley Council had still to announce their decision on the award.

QUESTION TIME

World Health Organisation Funds

Sir RICHARD ACLAND asked the Minister of Health whether he would instruct the representative of H.M. Government on the relevant committee of the World Health Organisation, at the next appropriate meeting of the committee, to press for a substantial increase in the regular budget of the organisation and to pledge this country to pay its fair share in the increase.—Miss PATRICIA HORNSBY-SMITH replied: The proposed regular budget of the organisation for 1955 shows a substantial increase over that approved for 1954, but the Minister is not satisfied that this increase is justified. The matter will be further considered at the next World Health Assembly. The United Kingdom contributes to the budget on a scale approved by the assembly. Our representative will not press for an increase in the total budget unless we are satisfied that it is justified.

Private Beds

Mr. ARTHUR MOYLE asked the Minister what steps were taken to ensure that private beds were not reserved for the use of fee-paying patients when there were urgent or chronic cases on the general waiting-list.—Miss HORNSBY-SMITH replied: The National Health Service Act, 1946, specifically provides for patients in urgent medical need of treatment to be admitted to a pay bed without charge if no alternative accommodation is available. The Minister has brought this to the notice of hospital authorities, and has also asked them to ensure that pay beds not in full use for private patients are used for other patients whether urgent cases or not.

Mr. MOYLE: Will the Parliamentary Secretary say what view the Minister takes of the heavy fees that are paid by private patients for minor operations like the removal of tonsils, for which they are able to get immediate attention within a week of the arrangement being made with the specialist or consultant, whereas children who, in the opinion of their parents are suffering from defective tonsils, have to wait as long as six months before they can get the operation done? Miss HORNSBY-SMITH: I hope the hon. Member will not exaggerate these claims, because in the case of hospitals in which he himself is interested the Minister has assured him that whereas 25 tonsillectomies were done a week under the National Health Service there were only 4 a year done on private fee-paying patients. I do not think it is fair to suggest that there is this widespread abuse when the case which was investigated for the hon. Member was not justified.

Labelling of Poisons

Lieut.-Colonel WENTWORTH SCHOFIELD asked the Home Secretary if, where the law provided that any poisonous fluid or substance must be marked or labelled Poison, he would make it compulsory that the antidote to the poison should also be clearly stated.—Sir DAVID MAXWELL FYFE replied: The Poisons Board has advised against the introduction of such legislation. Undue emphasis on antidotes might result in the loss of valuable time in obtaining medical help. Barbiturate poisoning, for example, which has been the commonest form in recent years, requires immediate hospital treatment, and any delay may be fatal. I hope no-one will rely on antidotes to the exclusion of getting immediate medical advice.

Recruitment of Sanitary Inspectors

Sir HAROLD SUTCLIFFE asked the Minister what action he proposed to take on the report of the Working Party on the recruitment, training, and qualification of sanitary inspectors.—Mr. IAIN MACLEOD replied: I and my colleagues who are concerned in the work of sanitary inspectors have now considered the report and I propose to discuss it with the interested bodies with a view to implementing the Working Party's proposals. It should not be inferred that I necessarily accept all the detailed recommendations of the Working Party.

Obituary

LUDWIK HIRSZFELD

M.D. Berlin, Prague, and Zürich

Professor Hirszfeld, who died at Wroclaw on March 7, was known far outside his own country and his own discipline, for his discoveries on blood-groups had offered to the growing sciences of anthropology and genetics the support of medicine.

He was born in Warsaw in 1884, and he studied medicine in Würzburg, qualifying in Berlin in 1907. His first interest was in cancer research and he worked in Heidelberg with Emil von Dungern and later in Zürich, where he became Privat-Dozent in 1914. But he was already interested in blood-groups, and he and von Dungern in 1910 published their important paper establishing that blood-groups are inherited according to mendelian laws.

[Mierzecka

On the outbreak of the first world war he volunteered to work with the Serbs in the Central Bacteriological Laboratory, first at Belgrade and later at Nish, where he vigorously supported Dr. William Hunter's crusade against typhus exanthematicus. His classical description of *Bact. paratyphosum* C, "Hirszfeld's bacillus," appeared in our columns in 1919. But his interest in blood-groups had not slackened. At first sight, conditions in war-time Macedonia might seem unfavourable for research; but with his wife, Dr. Hanka Hirszfeld, he took advantage of the heterogeneous character of the armies and their prisoners to investigate the racial distribution of blood-groups. They were able to show that on the whole the factor producing group A is prevalent among European peoples and the factor producing group B among those from Asia and Africa (*Lancet*, 1919, ii, 675).

On his return to Poland in 1920 he was appointed director of the Serum Institute in Warsaw and later of the Institute of Hygiene. In 1931 he became a professor in the medical and pharmacological faculty of the University of Warsaw, but after the German invasion in 1939 he was interned in the ghetto. There he organised a bacteriological laboratory, lectured in the secret school of medicine, and again had to fight typhus. He escaped in 1942 and hid under a foreign name. In 1944 he helped to organise the University of Lublin where he accepted the chair of microbiology. The following year he moved to Wroclaw where he was appointed dean of the faculty of medicine and, later, president of the Institute of Immunology and Experimental Therapy of the Polish Academy of Sciences, which since his death has been renamed in his honour.

Throughout this not uneventful life Hirszfeld steadily pursued his scientific work. He foresaw the possibility of incompatibility between the maternal and fœtal blood-groups long before this hypothesis was confirmed by the discovery of the Rh group, and in his latest studies he was investigating the mechanism of habitual abortion which he believed was often due to this cause. On the hypothesis of an allergic basis for abortion he gave anti-histamine drugs in this condition with apparent success.

The universities of Prague and Zürich had conferred on him the honorary degree of M.D., and he was a foreign member of the French Society of Allergy and of the Academy of Sciences, New York.

STUART SPENCE MEIGHAN

B.Sc., M.B. Glasg., F.R.F.P.S.

Dr. Spence Meighan died on April 20, at the age of 65 years, a short time after his retirement from his appointments as surgeon to Glasgow Eye Infirmary and ophthalmic surgeon to Stobhill Hospital.

His father, Dr. T. Spence Meighan, had preceded him as surgeon to the Glasgow Eye Infirmary, and he was educated at Glasgow High School and Glasgow University. The award of the Weir scholarship to him in his third year proved a reliable prognostic sign, for he graduated B.SC. in pure science in 1909 and M.B. with honours in 1912, and still found time to play rugger for the university XV. He was also a powerful swimmer and captained a Glasgow water-polo team.

As a houseman at the Western Infirmary he had the exhilarating experience of serving under Sir William Macewen and Ralph Stockman. After holding other junior posts, including a clinical assistantship at the Glasgow Eye Infirmary, he was commissioned in 1915 in the R.A.M.C. (T.F.). He served in France with a field ambulance in the 51st Highland Division, and he was twice mentioned in despatches before he was taken prisoner-of-war.

On demobilisation in 1919 he returned to the Glasgow Eye Infirmary as assistant surgeon. Later he became visiting surgeon to the Eye Infirmary and ophthalmic surgeon to Stobhill Hospital. In 1926 he was appointed professor of ophthalmology at the Anderson College of Medicine in the extramural school. In 1920 he was elected a fellow of the Royal Faculty of Physicians and Surgeons and he was an examiner in ophthalmology for the faculty. He also held office as president of the Scottish Ophthalmic Club and vice-president of the Ophthalmological Society of the United Kingdom. He was a member of the board of management for the Glasgow Northern Hospitals.

S. A. writes: "Spence Meighan became a legend in his own life-time. He was a comfortable soul—generously proportioned, ruddy complexioned, and by disposition genial and friendly. His outlook and temperament seemed essentially bucolic, but at heart he had an almost Johnsonian love of towns and cities. For a few years before he died he lived in the beautiful Blane valley, on the road to Killearn; but he could always find a good reason for driving into Glasgow, and Sauchiehall Street was his spiritual home. Nevertheless he could enjoy the open air and it was his delight to have sailing holidays on the Clyde with his neurosurgical colleague. Not the least engaging of his qualities was his loyalty to his friends and to the hospitals which he served—a loyalty so unswerving that it became a source of inspiration to all who worked with him."

Dr. Spence Meighan leaves a widow and two sons, one of whom is a senior registrar in medicine.

JOHN EDMUND BOWEN

M.A., M.B. N.U.I., D.P.H., D.M.R.E.

Dr. J. E. Bowen, who died in Dublin on April 19, at the age of 69, was a native of Galway City. He was educated there at St. Ignatius College and at Queen's (now University) College. After he had taken an M.A. degree in 1910, he was appointed assistant lecturer in physics and, although of retiring nature, he quickly won a well-deserved popularity for patient and lucid exposition of his subject. About 1919 he was appointed lecturer in physics at King's College, London. During his last few years in Galway he studied medicine and he completed his course in London at Middlesex Hospital and St. Bartholomew's Hospital. He graduated M.B. N.U.I. in 1921, and he took the D.P.H. in 1922 and the D.M.R.E. in 1923. Almost the whole of his medical career was spent in Shanghai, where he was superintendent and radiologist to the Country Hospital and chief radiologist to the Shanghai municipal council. During the war he was interned in Japan. He passed the last years of his life in Dublin.

J. C. writes: "John E, as he was affectionately called, left Galway in dark and troubled times and he was destined to travel 'far off ways,' but his heart, perhaps, remained in the Citie of the Tribes and it is there that he was buried."

He is survived by his wife, Miss Nettie Grealish, of Galway, whom he married in 1916.

Diary of the Week

MAY 9 TO MAY 15

Monday, 10th

WEST LONDON MEDICO-CHIRURGICAL SOCIETY
8.30 P.M. (1, Wimpole Street, W.1.) Sir William MacArthur: Pepys and the Plague. (Cavendish lecture.)

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Mr. Geoffrey Keynes: Second (and Third) Thoughts on Surgery of the Thymus Gland. (Annual oration.)

Tuesday, 11th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. J. Forest Smith: Nutrition and Child Health. (Second of two Croonian lectures.)

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Dr. L. M. Franks: Latent Carcinoma. (Imperial Cancer Research Fund lecture.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.30 P.M. *Section of Experimental Medicine.* Dr. F. V. Flynn, Dr. J. Hardwicke, Prof. A. C. Frazer, Prof. N. H. Martin: The Serum Proteins.
8 P.M. *Section of Psychiatry.* Dr. L. Stein, Mrs. Mary Williams, Miss Theodora Alcock: Stammering.

WRIGHT-FLEMING INSTITUTE OF MICROBIOLOGY, St. Mary's Hospital Medical School, W.2
5 P.M. Prof. P. B. Medawar, F.R.S.: Wound Healing with Special Reference to the Skin.

INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5.30 P.M. Dr. J. O. Oliver: Antibiotics.

CIBA FOUNDATION
5 P.M. (26, Portland Place, W.1.) Sir Macfarlane Burnet, F.R.S. (Melbourne): Problem of Virulence in Virus Disease.

UNIVERSITY OF EDINBURGH
5 P.M. (University New Buildings, Teviot Row.) Prof. Evarts A. Graham: Cancer of Lung. (Sir John Fraser lecture.)

Wednesday, 12th

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. J. A. Dudgeon: Virus Diseases.

MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School, University of Manchester.) *Section of Pathology.* Prof. R. A. Willis: Use and Abuse of Eponyms.

UNIVERSITY OF DUBLIN
4.30 P.M. (School of Physic, Trinity College.) Prof. E. B. Verney, F.R.S.: Water Diuresis. (John Mallet Purser lecture.)

Thursday, 13th

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Prof. M. L. Rosenheim: Treatment of Nephritis.

ROYAL SOCIETY OF MEDICINE
5 P.M. *Section of Ophthalmology.* Mr. H. E. Hobbs, Mr. W. E. S. Bain: Hormone Treatment in Macular Disease. Dr. C. H. Greer: Pre-cancerous Melanosis.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Dudgeon: Virus Diseases.

ALFRED ADLER MEDICAL SOCIETY
8 P.M. (11, Chandos Street, W.1.) Dr. Franklin Bicknell: Diet and Behaviour.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Medical School, Small's Wynd, Dundee.) Dr. R. W. G. Wyckoff: Use of Electron Microscope in Biology and Medicine.

SURREY INTER-HOSPITAL PSYCHIATRIC ASSOCIATION
5.30 P.M. (Roffey Park Rehabilitation Centre, Horsham, Sussex.) Dr. V. W. Wilson: Occupational Problems of the Neurotic. Dr. L. S. Davies: Value of Funkenstein Test. Dr. T. M. Ling: Psychological Problems Involved in Population Shift.

Friday, 14th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
2 P.M. Mr. E. P. Brockman: Disabilities of the Foot.
4 P.M. Prof. R. B. Hunter: Control of Anticoagulant Therapy in Myocardial Infarction.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. P. F. Borrie: Vascular Anomalies.

VARRIER-JONES LECTURE
5 P.M. (26, Portland Place, W.1.) Dr. H. G. Trimble (California): Current Therapy in Pulmonary Tuberculosis.

UNIVERSITY OF CAMBRIDGE
5 P.M. (Department of Pathology, Medical School.) Sir Macfarlane Burnet: Influenza Virus Genetics.

UNIVERSITY OF LEEDS
3.30 P.M. (University Union.) Dr. Alfred Blalock (Baltimore): Expanding Scope of Cardiovascular Surgery. (Moynihan lecture.)

Saturday, 15th

BIOCHEMICAL SOCIETY
11 A.M. (Department of Physiology, University, Bristol, 8.) Scientific papers.

Births, Marriages, and Deaths

BIRTHS

MICHELL.—On April 12, at the Middlesex Hospital, W.1, to Anne, wife of Dr. Guy Michell—a daughter.

DEATHS

BRODIE.—On April 21, in Malaya, Dr. Mabel Garland Brodie wife of Dr. W. H. Brodie.

Notes and News

WORLD HEALTH ORGANISATION

THE Seventh World Health Assembly, governing body of W.H.O., opened in Geneva on May 4 and will remain in session until May 22. More than 60 of its 84 member and associate-member States have sent delegations.

Outstanding questions on the agenda will be the proposal for an increase in W.H.O.'s regular budget from $8,500,000 in 1954 to $10,300,000 for 1955, put forward by the director-general, Dr. M. G. Candau; a proposal from several member States that the members of the executive board should be increased from 18 to 24 to give a wider geographical distribution of seats; and a request for admission of the Federation of Rhodesia (comprising Northern and Southern Rhodesia and Nyasaland) as an associate member.

Prof. Jacques Parisot of France is to be awarded the Léon Bernard Foundation prize in social medicine, and Dr. G. Robert Coatney (U.S.A.) and Prof. George MacDonald (U.K.) will receive awards from the Darling Foundation for their work on malaria.

Technical discussion will again be held during the assembly session, starting on May 8. This year's theme is Public Health Problems in Rural Areas.

THE BURDEN OF PENSIONS

"THE Growth of Pension Rights and their Impact on the National Economy" is discussed by a research group set up jointly by the Institute of Actuaries and the Faculty of Actuaries in Scotland.[1]

The proportion of our population who are over sixty-five years old is likely to rise (the report says) from 1 in 9 at present to 1 in 6 in twenty-five years' time. About 5,000,000 men and 1,300,000 women are covered by existing pension schemes, including the various schemes for public servants and the mineworkers' scheme, and the annual contributions paid under these schemes amount to £240 million of which £90 million is paid by the members themselves and the rest by their employers. There are now 600,000 pensioners with pensions amounting to £105 million. In addition there are National Insurance pensions and certain other State pensions, which bring the annual total of pensions paid up to £600 million—about 4% of the national income. In thirty years' time, it is estimated the total annual expenditure on pensions of all kinds in respect of pension rights already contracted for (including National Insurance) will have grown to £1200 million, on the basis of the present levels of wages and salaries.

It is not possible to estimate to what extent pension schemes will spread; but an upper limit to the potential growth may be obtained by assuming that in thirty years' time employed persons will receive by and large a retirement pension (including National Insurance) of two-thirds of their average earnings throughout their working life and that widows will receive a pension equal to half of their husband's pension. On these assumptions pension payments will grow to £2100 million—equal to 14% of the present national income; but about half of this amount would in any event be required to maintain the increased number of old people on a minimum subsistence level, which will have to be provided whether or not they are entitled to pensions. The growth in pension rights will necessitate a reduction in the standard of living of the rest of the population over the next thirty years, unless it proves possible to make a drastic reduction in the present cost of defence expenditure or unless the national income increases substantially. Before the war productivity per head was increasing by about 1½% per annum, while in several post-war years the rate has been as high as 3%. Even the lower rate, if continued for thirty years, would increase the national income by over 50%, which should permit of a substantial increase in the standard of living, in spite of the growth in the numbers and claims of the old people. One of the most important factors in increasing productivity per head is an increase in the amount of capital equipment per worker, and the growth of pension funds provides an important contribution to the volume of savings available to finance new capital investment.

In the long run, the report says, the money burden of pensions is not substantially altered by general late retirement, as in the State scheme, since individual pensions are frequently augmented when retirement is postponed. Some increase in the national product will be contributed by those who retire late, and retirement should therefore be postponed as long as possible without harmful effects on health or efficiency; but, as the number of elderly workers who could be added to the labour force is probably not more than 300,000, only a limited benefit can yet be expected from this source. Incentives to encourage deferment of retirement appear to be preferable to compulsory deferment of minimum pension ages.

In most private pension schemes contributions are accumulated in a fund, out of which the pensions are subsequently paid. The primary object in building up a fund is to safeguard the benefits by making sure that the money to provide them has been saved in advance; and the report considers the question whether the same principle should be applied to National Insurance pensions. The National Insurance scheme differs from private schemes in that the Government have power to raise money by taxation or borrowing to pay the benefits, and the deciding factor in determining the level of benefits is therefore likely to be the prevailing trend of opinion about the proper provision that should be made for old people. From the standpoint of the national economy, the funding of pension schemes is of value only if it helps to increase the future level of national production, since in real terms the consumption of pensioners during any period must be met out of the current production of that period. Hence the funding of the National Insurance scheme would not help to alleviate the ultimate burden of pensions unless it provided a genuine addition to the volume of savings—not a mere substitution for savings which would otherwise have been made in some other form—and results in a real increase in capital investment. If the National Insurance retirement pensions were to be funded, the initial annual cost would be between £550–700 million, which would presumably have to be found mainly from taxation. These figures suggest that any attempt at a full funding of the National Insurance retirement pensions would be largely at the expense of other forms of saving.

1. A limited number of copies are available from the Institute of Actuaries, Staple Inn Buildings, Holborn, London, W.C.1.

SMOKING AND LUNG CANCER

THE April issue of *Medical World* [1] is devoted to a single topic—smoking and lung cancer. Dr. Richard Doll writes on incidence and ætiology, Dr. C. H. C. Toussaint on problems of early diagnosis, and Dr. W. P. Cleland on treatment and prognosis. The second half of the journal contains a symposium of the opinions of 7 family doctors, 7 consultants, and 7 medical officers of health and administrators.

WELFARE FOODS AFTER RATIONING ENDS

REVISED arrangements for the welfare milk scheme will be introduced on Oct. 31. Between Sept. 20 and that date, beneficiaries will receive a book of welfare milk tokens in exchange for their ration-books. These tokens can be used with any milk retailer anywhere; each token will enable the housewife to get 7 pints of milk at the welfare price (now 1½*d.* a pint) or 1 tin of national dried milk (equivalent to 7 pints of liquid milk) at the welfare price (now 10½*d.*). Books of tokens will be issued by the local offices of the Ministry of Pensions and National Insurance, and of the Ministry of Labour and National Service. Expectant mothers will receive books of up to 26 tokens, and children, books of 52 tokens. Application forms will be posted to everyone entitled to liquid milk under the scheme. Forms for those beneficiaries taking dried milk will be available at welfare foods distribution centres. The name and address and national insurance number of the expectant mother or of the parent or guardian of a child will be required on these forms.

Rationing ends on July 3, but those entitled to welfare milk must keep their books; for they will need them whenever they wish to change their retailer—e.g., when going on holiday—and will also have to produce them if they wish to get national dried milk.

The issue of other welfare foods (orange juice, cod-liver oil, and vitamins A and D tablets) will also continue after rationing ends. There will be no change in the present entitlements. Beneficiaries have already been notified that new books of coupons for orange juice and cod-liver oil are now obtainable from local food offices for use after May 15 when the coupons in the child's current green ration-book (R.B.2) will have been used up.

Local authorities in England and Wales have agreed to take over the distribution of welfare foods (other than liquid milk) when the local food offices close, and they have been

1. Published at 55, Russell Square, London, W.C.1. 4*s*.

asked to arrange to take over all local distribution from June 28. Similar arrangements are being made with local authorities in Scotland.

University of Glasgow

On Saturday, May 1, the degree of M.D. was conferred on the following :

* Donald Macrae (high commendation) ; James Walker (honours) ; H. G. Easton, J. T. Hutchinson.

* In absentia.

Royal College of Physicians of London

At a comitia held on April 29, with Sir Russell Brain, the president, in the chair, the following were elected to the fellowship :

M. K. GRAY, Christchurch ; I. G. DAVIES, Leeds ; E. T. D. FLETCHER, London ; O. E. J. MURPHY, Brisbane ; C. L. STOTE, Shrewsbury ; L. G. BELL, Winnipeg ; H. M. RENNIE, Sydney ; RALPH WHISHAW, Hobart ; A. C. E. COLE, Dar-es-Salaam ; E. C. ALLIBONE, Leeds ; H. B. MAY, London ; E. M. DARMADY, Havant ; H. A. DEWAR, Newcastle upon Tyne ; J. M. HOLFORD, surgeon commander R.N. ; A. P. DICK, Cambridge ; D. H. G. MACQUAIDE, Northampton ; JAMES CARSON, Sheffield ; RAYMOND GREENE, London ; R. J. G. MORRISON, lieut.-colonel R.A.M.C. ; GEORGIANA M. BONSER, Leeds ; C. E. DENT, London ; J. M. NAISH, Bristol ; T. N. MORGAN, Aberdeen ; K. S. MACLEAN, London ; JOHN LOWE, London ; A. P. NORMAN, London ; J. HAMILTON PATERSON, London ; G. MACG. BULL, Belfast ; L. G. BLAIR, London ; ROBERT KIRK, Khartoum ; D. V. HUBBLE, Derby.

The following were elected to the fellowship under by-law 39b, which provides for the election of non-members " who have distinguished themselves in any branch of the service or practice of medicine " :

A. P. MURPHY, P.R.A.C.P. Brisbane ; Sir ERIC PRIDIE, London ; H. E. SIGERIST, Zürich and Yale University.

The following, having satisfied the censors' board, were elected to the membership :

K. D. Bagshawe, M.B. Lond., Katharine M. Baker, M.B. Lond., F. H. Burns, M.B. Sydney, S. I. Cohen, M.D. Lond., John Colvin, M.B. Glasg., P. B. Cook, M.B. Lond., J. J. Daly, M.B. Camb., lieut. R.A.M.C., J. R. Edsall, M.B. Camb., I. E. Evans, M.B. Lond., Yvette A. P. Franklin, M.B. Lond., R. G. Gibbs, M.B. Camb., A. J. Geble, M.D. Melbourne, J. D. S. Hammond, M.B. Sheff., P. J. D. Heaf, M.D. Lond., Cherry D. Heath, M.D. Lond., J. B. Hickie, M.B. Sydney, Alison Hunter, M.B. N.Z., J. D. Hunter, M.B. N.Z., John Knox, M.B. Glasg., P. J. Lawther, M.B. Lond., D. G. Le Roux, M.B. Cape Town, D. Y. Mackenzie, M.D. Lond., J. McE. Neilson, M.B. Glasg., Patience Proby, B.M. Oxfd, A. J. Proust, M.B. Sydney, P. M. Rooze, L.R.C.P. J. F. Soothill, M.B. Camb., M. D. Turner, M.B. Brist., H. E. Webb, B.M. Oxfd, Eric Wilkes, M.B. Camb., M. M. Zion, M.B. Witwatersrand.

Licences to practise were conferred upon the following 129 candidates who have passed the final examination of the conjoint board :

S. L. Adesuyi, L. N. Allen, T. D. Annear, Diana Austin, Jacqueline E. Banbury, Laurence Barsey, D. G. Bennett, Abraham Berry, H. R. Bissoon Dath, A. S. Blake, Gwyneth J. D. Botherway, Angela I. Brooks, Jean Brown, D. C. L'E. Burges, Patricia Burne, P. M. G. Camm, Jean Carberry, June M. Cheetham, Brenda A. P. Clark, R. M. Clark, David Constad, I. J. Cope, I. C. Cree, M. R. Crompton, R. N. Davis, Brian Dawson, Jean E. Drake, Peter Dromgoole, D. P. Duffield, Lise L. Einerl, R. A. Ellis, P. A. S. Evans, C. D. Ferrier, A. S. E. Fowle, J. K. Frost, Peter Garmon-Jones, Grace M. Gee, Mary H. Godwin, Peter Gortvai, R. A. Grande, Brenda Grant, W. B. Hanley, Leonard Harbin, L. M. Hart, David Hide, G. M. R. Holliday, P. E. Hoogewerf, A. B. Hugo, L. H. Hurrell, W. M. Huse, Isadore Ingleby, Barbara M. Isles, D. C. Jackson, P. D. C. Jarman, Peter Jenkins, A. R. Jones, Erica J. Jones, F. W. Jones, H. D. Jones, J. A. Kay, Peter Kellett, C. E. Langham, Diana E. Lathbury, N. A. G. Leadbeater, J. E. Leaney, J. J. Lewis, D. C. Linahan, Patricia J. Lindop, B. A. Lowe, Colin Lowson, J. A. McMillan, W. M. Mee, Margaret S. Meyer, H. N. Middleton, K. F. Mole, A. A. D. Moore, Janet E. Morgan, Oswald Morton, Patricia E. Moul, Sheila M. Mullally, D. D. Munro, T. W. Nicholson, Wendy E. Noble, Patricia Painter, M. S. K. Palmer, Arnold Pearce, K. I. Pearce, Valerie J. Perkins, J. M. Phillips, C. W. Pook, Denys Pownall, J. A. Purcell, J. R. Rawstron, Dorothy S. Read, Kathleen M. Reid, J. E. S. Relton, Corinne J. Richardson, D. F. Rideout, G. D. Ripley, Derrick Roberts, Margaret Russell, J. G. Sanderson, A. C. Skarbek, J. C. Smith, R. W. Smith, D. L. Smithson, B. K. Sood, G. P. St C. Starck, Leo Stimmler, Jane Sweatman, Eileen N. Thompson, T. M. Tibbetts, W. R. Tidy, E. E. D. Tomlin, Annie M. N. Tustin, Heather F. A. Vickery, Dragomir Vuckovic, J. G. Wall, D. R. Whitehouse, D. H. Williams, H. R. Willings, J. H. P. Willis, A. J. Winterton, Joan M. Woodley, Celia B. M. Wookey, Enid M. Wozencroft, R. T. Yip-Choy, A. Youatt, C. F. A. Younger.

The following diplomas and those mentioned in our issue of April 17 (p. 840) were conferred jointly with the Royal College of Surgeons :

D.A.—A. J. Sims.

D.C.H.—Susanne M. Salvisberg.

D.T.M. & H.—Rahim Muhsin Ajina, Evelyn C. Cummings, J. S. Dodge, Nandkumar Damodar Gosavi, A. E. Gunders, Vishwanath Ganesh Nivsarker, Hla Kyaw Pe, C. E. P. Samarasinghe, Suranjan Sen Gupta, T. K. Sweeney, Syed Abu Talib.

Hunterian Society of Great Britain

Dr. W. S. C. Copeman has been elected president of this society in succession to Sir Heneage Ogilvie.

Royal Medical Benevolent Fund

The annual general meeting of the Fund is to be held on Friday, June 4, at 5 P.M., at 11, Chandos Street, London, W.1, when Lord Webb-Johnson, the president, will take the chair.

Institute of Social Psychiatry

Dr. J. L. Moreno of New York will deliver a lecture to the institute at 1, Wimpole Street, London, W.1, on Monday, May 17, at 8 P.M., on Recent Advances in Sociometry.

State Medicine in the Nineteenth Century

Prof. W. M. Frazer will give three Newsholme lectures on this subject at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, on May 24, 25, and 26, at 5.15 P.M.

Ministry of Health

The Minister of Health, Mr. Iain Macleod, has appointed Mr. R. B. Mayoh to be his assistant private secretary. The Parliamentary Secretary to the Ministry, Miss Hornsby-Smith, has appointed Miss P. M. Ibbotson to be her private secretary.

Association of Optical Practitioners

Mr. Stanley Wells, F.S.M.C., is delivering the Ettles lecture to this association on Wednesday, May 19, at 8 P.M. at the London School of Economics and Political Science, Houghton Street, London, W.C.2. He is to speak on Visual Problems of Older Workers in Industry.

The Concept of Race

On Saturday, May 15, at 2.30 P.M., at 45, Russell Square, London, W.C.1, the Medical Association for the Prevention of War is holding a conference on this subject. The speakers include Prof. Lionel Penrose, F.R.S., Dr. N. A. Barnicot, Mr. S. Sachs, and Dr. Duncan Leys.

Royal Society

The four new foreign members elected to this society include Prof. Karl von Frisch (Munich) and Prof. Otto Loewi (New York). Professor von Frisch is honoured for his work on the physiology of the chemical and visual sense organs of animals, especially insects and fish, and Professor Loewi for being the first to demonstrate the transmission of the effects of nerve-impulses by the release of chemical transmitters.

The Metropolitan Ear, Nose and Throat Hospital (outpatient department) has been transferred to St. Mary Abbots Hospital, Marloes Road, Kensington, W.8.

Appointments

JONES, LILIAN F., M.B. Birm., M.R.C.P. : house-physician, The Hospital for Sick Children, Great Ormond Street, London.

LAIDLAW, C. D'ARCY, F.R.C.S. : surgical registrar, Southmead Hospital, Bristol.

LAWRENCE, ROSEMARY W., M.B. Edin. : house-surgeon to orthopædic and plastic departments, The Hospital for Sick Children, Great Ormond Street, London.

MAY, C. R., L.M.S.S.A., surgeon lieutenant R.N. : asst. M.O., British Transport Commission (London Midland Region).

TRUSCOTT, D. E., M.B. Lond., D.M.R.D. : consultant radiologist, West Cornwall clinical area.

WHINCUP, H. H., M.B. Lpool : asst. M.O., British Transport Commission (London Midland Region).

Appointed Factory Doctors :

MYERS, CARL, M.B. Sheff. : Preston, Lancs.

REA, A. H., M.B. Camb. : Halstead, Essex.

TAYLOR, WILLIAM, M.B. : Castletown, Caithness.

WILSON, C. L. L., L.R.C.P.I. : Newington, Kent.

Colonial Medical Service :

CAMERON, J. G., M.B. Witwatersrand, M.R.C.O.G. : specialist (obstetrician and gynæcologist), Medical Department, Gold Coast.

FUNG-A-FAT, A. G. E., M.B. : M.O., British Guiana.

GREENAWAY, D. G. G., M.R.C.S. : M.O., Falkland Islands.

MCMAHON, F. S., M.B. N.U.I. : house-physician, Colonial Hospital, Windward Islands.

RUGGLI, P. A., M.D. : M.O., Gold Coast.

TAYLOR, JAMES, M.B. Glasg., D.P.H., D.T.M.&H. : D.D.M.S., Sarawak.

VARDY, E. C., M.D. Durh. : D.D.M.S., Sarawak (Brunei).

North East Metropolitan Regional Hospital Board :

ATHERSTONE, R. N. G., M.A., M.B. Camb., F.F.A.R.C.S., D.A. : part-time consultant anæsthetist, King George and Ilford Isolation hospitals.

BALME, H. W., M.D. Camb., M.R.C.P. : full or maximum part-time consultant physician, Whipps Cross Hospital.

ENTICKNAP, J. B., M.D. Lond., D.C.P. : full-time consultant pathologist, East Ham Memorial Hospital.

RUSSELL, ALEXANDER, O.B.E., M.D. Durh., M.R.C.P., D.C.H. : part-time consultant pædiatrician, Harold Wood and Ilford Maternity hospitals, and Ilford Public-health Offices Clinic.

THICK, G. C., M.B. Lond., F.F.A.R.C.S., D.A. : part-time consultant anæsthetist, Hertford group of hospitals.

The SAFE SELECTIVE wide-range Antibiotic for Children

PAEDIATRIC SUSPENSION

★ Administered Orally — Delightfully flavoured
★ Effective against the most common pathogenic organisms — Staphylococcus, Streptococcus, Pneumococcus
★ Effective against resistant strains
★ SAFE — no alteration in normal blood picture
★ 100 mg. in each 5 c.c. (large teaspoonful)
★ Dose ½ teaspoonful per stone bodyweight every 6 hours.

A NEW SAFE ORAL Antibiotic against MOST of the common infections of childhood.

Lilly TRADE MARK

the ORIGINATOR of Erythromycin

ELI LILLY AND COMPANY LIMITED . BASINGSTOKE . HANTS

IRON *WITHOUT IRRITATION*

'Fergon' (ferrous gluconate) does not produce the gastro-intestinal disturbances often associated with iron therapy. This is particularly valuable in hypochromic anæmia of pregnancy since patients who cannot tolerate other iron preparations are able to take 'Fergon' without discomfort. Absence of irritant effects also ensures maximum absorption and utilisation of iron with a consequently rapid rise in the hæmoglobin rate.

PACKINGS: *tablets gr. 5 in bottles of 100 and 1,000; liquid (6%), for infants and young children, in 4 oz. and 80 oz. bottle.*

Medical literature and sample on request

*** The reduced basic N.H.S. cost of one week's treatment with 'Fergon' tablets is 8d. The basic N.H.S. price of 'Fergon' liquid is 3s. per 4 oz. bottle.**

FERGON

Trade Mark

Manufactured in England by:

BAYER PRODUCTS LIMITED AFRICA HOUSE · KINGSWAY · LONDON W.C.2

Associated export company: WINTHROP PRODUCTS LIMITED, LONDON

Patients are people

Many of your patients are people who have been conditioned all their lives to associate the smell of antiseptics and medication with pain. When they are in the presence of "hospital smells," they grow tense and nervous, hyper-sensitive to their symptoms and worries.

Such sensitivity is not only distressing to the patient; it is frequently irritating to the nursing staff. Even more disturbing to staff and patients alike are the malodours associated with certain conditions and their treatment—incontinent patients, suppurating wounds.

Fortunately, the odours that are associated with hospitals and nursing homes can be easily and economically abolished with Air-wick.

Physiologists have recorded that when certain pairs of odours are together present in appropriate relative concentrations, both are diminished. Developed by scientists as an application of this phenomenon, Air-wick contains a large number of compounds, scientifically selected to achieve its results.

Air-wick is non-toxic and non-inflammable. Air-wick in bottle form can be used in small sickrooms with excellent results, while for larger wards a special Air-wick fan unit has been developed. For sudden, local concentrations of odour, Air-wick mist, recently perfected, has had a marked success.

For the greater comfort and happiness of your staff and patients, we confidently suggest the regular use of Air-wick. Full particulars of the cost, installation and most efficient way to use Air-wick may be had on application.

THE HOSPITAL SERVICE DEPARTMENT

Airwick Ltd.
SLOUGH, BUCKS

Air-wick—THE EFFICIENT ODOUR-COUNTERACTANT

PATIENTS FIND IT VERY DELICIOUS

So often the sick, especially the very sick, find it difficult to enjoy a pleasant drink — but LUCOZADE invariably "fills the bill."
Patients of all ages find this sparkling presentation of glucose entirely delicious.
LUCOZADE in fact may be described as an almost perfect appetiser, sustaining in itself and a delightful stimulus to the desire for more solid food.

Lucozade

the sparkling GLUCOSE *drink*

HUMANISED TRUFOOD

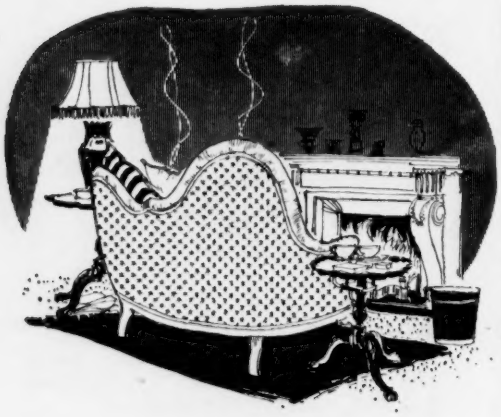
A milk modification specifically designed to meet the nutritional needs of the normal infant

Humanised Trufood is not just a dried milk: it is a modification of cows' milk specifically designed to meet the needs of the normal infant from birth.
The fat content compares favourably with that of "Full Cream" dried milk powders.
Moreover, as Trufood is dried by the spray process the fat is kept in a fine, well-diffused emulsion, thus ensuring easier assimilation.
Full information about Humanised Trufood and of the six other Trufood milks for infants will be supplied on request to Trufood Limited, Green Bank, London, E.1.
You will find that when you have to feed an infant artificially there is a better Trufood milk available whatever your requirement may be.

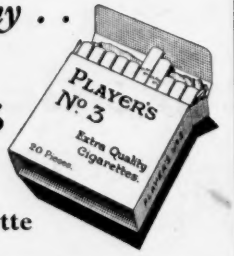
TRUFOOD

The Trufood Creameries and Laboratories are at Wrenbury in Cheshire

TFD 50-1789



Two's Company . .
with
PLAYER'S Nº3



The Quality Cigarette

[3P 121A]

NUTRITION

in

Post-Pyrexial Cachexia

ST. IVEL (Lactic) CHEESE

The protein requirements of the body are increased during and following pyrexia and the digestive system is more refractory.

This special cheese provides the physician with an answer to this difficult and all important problem during convalescence.

Communications should be addressed to The Director, Central Laboratory, Aplin & Barrett Ltd., Yeovil, Somerset.

Health and Medicine in the U.S.S.R.

Preventive Medicine — New Achievements of Soviet Surgeons — Secondary Medical Education in the U.S.S.R. — In the Clinics and Laboratories of Soviet Medical Scientists.

These and other illustrated features appear in the special

Soviet Weekly

May 13 issue

"*Soviet Weekly*" is available from newsagents and booksellers or direct from the publishers each Thursday, 3d. For copies of this special issue (*Rates : 3d. for one copy ; 6d. for three. Post Free*), free specimen copies of recent issues and further details please write immediately to :

SOVIET WEEKLY

(dept. L/T), 3 Rosary Gardens, London S.W.7

QUEEN

Non Allergic

BEAUTY PRODUCTS

THE SAFETY FACTOR IN EVERY DAY MAKE-UP

Queen beauty products form a complete range of toilet and beauty preparations, including lipsticks, specially for those women who have sensitive skins. Queen products contain no orris in any form, nor any other skin irritants AND ARE RECOMMENDED BY THE MEDICAL PROFESSION. Obtainable from John Bell & Croyden, 50 Wigmore Street, W.1, and other chemists.

Write for Price List to :—

BOUTALLS CHEMISTS LTD.

60 Lambs Conduit St., London, W.C.1

JENNER INSTITUTE Glycerinated VACCINE LYMPH

PREPARED IN ACCORDANCE WITH THE THERAPEUTIC SUBSTANCES REGULATIONS (BRITISH PRODUCT)

Telephone: BATTERSEA 1347

SINGLE VACCINATION TUBES - - - 12/- dozen. Postage extra
LARGE TUBES (EXPORT only) sufficient for 5 vaccinations, 20/- dozen

Telegrams: "JENVACTER, SOUPHONE, LONDON" (2 words)

JENNER INSTITUTE FOR CALF LYMPH LTD., 73, Battersea Church Road, S.W.11

BOWDEN HOUSE

HARROW-ON-THE-HILL, MIDDLESEX

Established in 1911 Tel. : BYRon 1011 & 4772
(Incorporated Association not carried on for profit)

A private clinic for the treatment of the neuroses and nervous disorders by psychotherapy and all modern physical therapies.

Apply : MEDICAL DIRECTOR

HEIGHAM HALL, NORWICH

PRIVATE MENTAL HOME for Nervous and Mental illness. All types of treatment carried out. Accommodation for Alcoholics and Addicts available. Special Geriatric Unit now open. Fees from 6 gns. per week upwards according to requirements.

Apply to Dr. J. A. SMALL Telephone : Norwich 20080

SPRINGFIELD HOUSE

Phone : BEDFORD 3417 **Near BEDFORD**

For MENTAL CASES (including the aged)

Fees from Eight Guineas per week

For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.

INTERVIEWS IN LONDON BY APPOINTMENT.

PARK SANATORIUM

(FORMERLY SANATORIUM TURBAN)

DAVOS-PLATZ, SWITZERLAND

First-class house, 5,150 feet above sea-level. Large park and wood belonging to the Sanatorium. Terms for board and residence, including room, medical treatment, etc., from Fcs. 18 per day. Prospectus.

Medical Superintendent, F. CHARLES, M.D.

CHISWICK HOUSE

PINNER, MIDDLESEX

Telephone : PINNER 234

A Private Home for the Treatment and Care of Mental and Nervous Illnesses in both Sexes.

A modern house, 12 miles from Marble Arch, in attractive secluded grounds. Patients treated under Certificate, Temporary or Voluntary status. Modern forms of treatment, including psychotherapy, narco-analysis, modified insulin, occupational therapy, E.C.T., etc. Fees from 12 guineas a week.

DOUGLAS MACAULAY, M.D., D.P.M.

CAMBERWELL HOUSE, 33, Peckham Road, London, S.E.5

Telegrams : "PSYCHOLIA, LONDON"

A PRIVATE HOSPITAL FOR THE TREATMENT OF NERVOUS AND MENTAL DISORDERS

Telephone : RODNEY 4242 (2 lines)

Completely detached Villas for mild cases. Voluntary Patients received. Fifteen acres of grounds. Hard and grass tennis courts, putting greens, Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actinotherapy, prolonged immersion baths, shock and all modern forms of treatment. Chapel.

Senior Physician Dr. THOMAS T. BARTLETT, assisted by a resident Medical Staff and visiting Consultants

An Illustrated Prospectus giving fees, which are reasonable, may be obtained upon application to the Secretary

RUTHIN CASTLE, NORTH WALES

A Private Clinic, the first in Great Britain, for investigation and treatment of all forms of disease, except infectious and mental

Nursing, dietetic, massage, x-ray and laboratory departments **Central heating and a lift to all floors**

Inclusive charges Apply SECRETARY Telephone: Ruthin 66

CLIFFDEN, TEIGNMOUTH

For the early treatment of nervous disorders and patients needing rest and care

A well-appointed House with spacious balconies and extensive views of the South Devon Coast. Beautiful garden and own dairy in 35 acres In the same grounds, **ROWDENS**, a comfortable house with lovely views. Private road to the beach
There is also a charming house, **EBWORTHY, MANATON, DARTMOOR**, situated in 25 acres, 1100 ft. up for bracing moorland air

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. *Telephones*—TEIGNMOUTH 289 and 537

MUNDESLEY SANATORIUM

MUNDESLEY, NORFOLK

TERMS FROM 16 GUINEAS WEEKLY (Single Room). Waiting list: 2 weeks
" " 14 " " (Shared Room). Immediate vacancies

Medical Superintendents :

E. C. WYNNE-EDWARDS
M.B.(Cantab.), F.R.C.S.(Edin.)

GEORGE H. DAY
M.D.(Cantab.)

For all information apply THE SECRETARY

Telephone: Mundesley 94 and 95 (2 lines)

ST. ANDREW'S HOSPITAL FOR NERVOUS AND MENTAL DISORDERS
NORTHAMPTON

PRESIDENT: THE EARL SPENCER

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., F.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, biochemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods; insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombières treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-ray Room, an Ultraviolet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for biochemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: Northampton 4354 (3 lines)), who can be seen in London by appointment.

Vacancies

ACADEMIC AND EDUCATIONAL SECTION *Page* 32

ANÆSTHETICS
South East Met. R.H.B. P.-t. Cons. 33
West London, W.6. Reg. 36
Birmingham. Dudley Road. Sr. H.O. 37
Birmingham (Selly Oak) Group of Hosps. Cons. 33
Birmingham United Hosps. Regs. & Sr. H.O. 37
Bradford Royal Infy. H.O. 37
Bradford. St. Luke's. H.O. 37
Bury & Rossendale H.M.C. Sr. H.O. 38
Colchester Group H.M.C. Sr. H.O. .. 38
Dudley, Stourbridge & Dist. Sr. H.O. 39
East Anglian R.H.B. Regs. 39
Guildford. Royal Surrey County. Sr. H.O. 39
Halifax Area Hosps. M.C. Jr. H.M.O. 40
Leamington Spa. Warneford Gen. H.O. 41
Leeds A Group H.M.C. Sr. H.O. .. 41
Leeds R.H.B. Locum Cons. or Sr. H.M.O. 33
Leeds R.H.B. Regs. 40
Liverpool. Aintree. Sr. H.O. 41
Maidstone. Mid-Kent H.M.C. Sr. H.O. 41
Manchester R.H.B. Cons. 33
Manchester United Hosps. Reg. .. 42
Manchester United Hosps. Sr. H.O. 42
Newcastle R.H.B. Cons. 33
Nottingham Gen. Sr. H.O. 43
Perth Gen. Hosps. Sr. H.O. .. 43
Plymouth & Devonport. South Devon & East Cornwall. Sr. H.O. 43
Pontypridd. East Glamorgan. Sr. H.O. 43
Reading. Royal Berks. Jr. Anæs. .. 44
Redhill County. Sr. H.O. 44
Scotland. Western R.H.B. Cons. .. 34
Scotland. Western R.H.B. Reg. .. 44
Sheffield. City Gen. Sr. H.O. .. 44
Sheffield R.H.B. Sr. H.M.O. .. 34
Sheffield United Hosps. Reg. & Sr. H.O. 45
South East Met. R.H.B. P.-t. Cons. 34
Stockport & Buxton H.M.C. Sr. H.O.'s & Locums 45
Stoke-on-Trent. North Staffs Royal Infy. Sr. H.O. 45
Wakefield A Group H.M.C. No. 9. Jr. H.M.O. 46
Warrington Infy. Sr. H.O. 46
Welsh R.H.B. Sr. H.M.O. 34
United States. Mount Auburn. Residencies 47

CASUALTY
Hackney, E.9. H.O.'s 35
Prince of Wales's Gen., N.15. Sr. H.O. 35
Ashford, Kent. H.O. 36
Birmingham R.H.B. Reg. 37
Brighton. Royal Sussex County. Jr. H.M.O. & H.O. 37/38
Cardiff. St. David's. Sr. H.O. .. 38
Chesterfield Royal. Pre-reg. H.O. or Sr. H.O. 38
Croydon. Mayday. Sr. H.O. .. 38
Dudley, Stourbridge & Dist. Sr. H.O.'s 39
Hemel Hempstead. West Herts. Jr. H.M.O. 39
Hertford County. H.O. 39
Lancaster. Royal Lancaster Infy. Sr. H.O. 40
Leamington Spa. Warneford Gen. Sr. H.O. 41
Leeds. Public Dispensary & Hosp. Sr. H.O. 40
Maidstone. West Kent Gen. Sr. H.O. 41
Manchester United Hosps. Sr. H.O. 41
Morecambe. Queen Vic. Sr. H.O. or Locum 42
Newport, Mon. Royal Gwent. Sr. H.O. 42
Nottingham Gen. Reg. & Sr. H.O. 42/43
Perth Gen. Hosps. H.O. 43
Perth Royal Infy. H.O. or Sr. H.O. .. 43
Romford. Oldchurch. Sr. H.O. .. 44
Salisbury Gen. Sr. H.O. 44
Southport & Dist. H.M.C. Sr. H.O. .. 45
Stockport & Buxton H.M.C. Sr. H.O. 45
Taunton H.M.C. Pre-reg. H.O. .. 46
Weymouth & Dist. Sr. H.O. .. 46
Wolverhampton Group. H.O. .. 47
Channel Islands. Jersey Gen. H.O. .. 47

CHEST AND TUBERCULOSIS
Guy's, S.E.1. Sr. Reg. 35
North East Met. R.H.B. Sr. H.M.O.'s 33
Aylesbury. Royal Bucks & Assoc. Hosps. M.C. H.O. 36
Bristol. Cossham/Frenchay H.M.C. H.O. 37
Derby. Derwent. Reg. 39
Dudley, Stourbridge & Dist. Sr. H.O. 39
Newcastle R.H.B. Reg. 42
Scotland. Red Cross Sanatoria. Sr. H.O. 44
Scotland. Western R.H.B. Sr. H.M.O. 34
South East Met. R.H.B. Sr. H.M.O. 34
Ventnor. I.O.W. Royal Nat. Hosp. for Diseases of the Chest. Jr. H.M.O. & Sr. H.O. 46

DENTAL SURGERY
Aylesbury. Royal Bucks & Assoc. Hosps. M.C. Sr. H.O. 36
Plymouth & Devonport, South Devon & East Cornwall. H.O. 43
Dublin. St. Laurence's. Hon. Dental Surgeon 34

DERMATOLOGY
Liverpool United Hosps. Sr. Reg. .. 41

EAR, NOSE, AND THROAT
Royal National T.N.&E. Reg. & Sr. H.O. 35
Barnsley. Beckett. Sr. H.O. 36
Birmingham & Midland E. & T. Sr. H.O. or H.O. 36
Birmingham R.H.B. Reg. 37
East Cumberland H.M.C. H.O. .. 39
Farnborough, Kent. Sr. H.O. .. 39
Halifax Royal Infy. H.O. 40
Inverness Hosps. B.O.M. H.O. .. 40
Leamington Spa. Warneford Gen. H.O. 41
Llanelly. Jr. H.M.O. 41
Maidstone. Kent County Ophthalmic & Aural. Sr. H.O. 41
Manchester R.H.B. Reg. 42
Perth Gen. Hosps. H.O. 43
Salisbury Gen. Sr. H.O. 44
Scotland Western R.H.B. Reg. .. 44
Southampton. Royal South Hants & Gen. Sr. H.O. 45
Southport & Dist. H.M.C. Sr. H.O. .. 45
Stoke-on-Trent. North Staffs Royal Infy. Sr. H.O. 45
Swansea. Sr. H.O. 46
Woking & Chertsey Group. Reg. .. 47
Wolverhampton Group. H.O. .. 47

GERIATRICS
St. Matthew's, N.1. Sr. H.O. .. 35
Cardiff. St. David's. H.O. 38

HÆMATOLOGY
North London Blood Transfusion Centre. Jr. H.M.O. 35

INFECTIOUS DISEASES
Leeds R.H.B. Reg. 40
Portsmouth Group H.M.C. Sr. H.O. 44
Stoke-on-Trent. Bucknall Isolation. Sr. H.O. 46

MEDICINE
Battersea Gen., S.W.11. H.O. .. 34
Elizabeth Garrett Anderson, N.W.1. H.O. 34
Invalid & Crippled Child's, E.13. H.O. 35
Poplar, E.14. Sr. H.O. 35
Prince of Wales's Gen., N.15. Sr. H.O. 35
Royal Northern, N.7. H.O. 35
West London, W.6. H.O. 36
Ashford, Middx. H.O. 36
Bideford & Dist. H.O. 37
Birmingham United Hosps. Reg. .. 37
Bolton & Dist. H.M.C. Sr. H.O. .. 37
Bradford Royal Infy. Sr. H.O. .. 37
Cheltenham Gen. H.O. 38
Colchester Group H.M.C. H.O. .. 38
Croydon. Mayday. Pre-reg. H.O. .. 38
Dorking Gen. H.O. or Sr. H.O. .. 38
Hastings. St. Helens. H.O. 39

Hove Gen. Pre-reg. H.O. 40
Huntingdon County. H.O. 40
Leeds United Hosps. Reg. 40
Liverpool. Walton. H.O. 41
Manchester R.H.B. Reg. 42
Manchester United Hosps. Sr. Reg. 42
Northwood. Mount Vernon. H.O. .. 42
Nottingham Gen. Sr. H.O. & H.O.'s 43
Perth Gen. Hosps. H.O.'s 43
Reading Area Dept. of Medicine. H.O. 44
Romford. Vic. H.O. 44
Scotland. Western R.H.B. Deputy Group Med. Sup. 34
Shrewsbury. Royal Salop Infy./ Copthorne Hosp. H.O. 44
Southampton Gen. H.O. 45
Southport & Dist. H.M.C. H.O.'s .. 45
Winchester. Royal Hants County. H.O. 46

NEUROLOGY

Hosp. for Sick Children, W.C.1. Sr. H.O. 36
St. Mary's, W.2. P.-t. Cons. .. 33
St. Thomas's, S.E.1. P.-t. Cons. .. 33
Leeds R.H.B. Cons. 33

NEUROSURGERY

National Hosp. for Nervous Diseases. Sr. H.O. or Reg. 35
St. George's, S.W.1. Sr. H.O. .. 36
Bristol. Cossham/Frenchay H.M.C. Sr. H.O. 37

OBSTETRICS AND GYNÆCOLOGY

Elizabeth Garrett Anderson, N.W.1. H.O. 34
Mothers', E.5. Sr. H.O. 35
South London Hosp. for Women & Child., S.W.4. H.O. 35
St. Thomas's, S.E.1. H.O. 36
Aberdeen Gen. Hosps. B.O.M. Sr. H.O. 36
Cambridge Maternity. H.O.'s .. 38
Edgware Gen. H.O. 39
Glasgow. David Elder Infy. H.O. .. 39
Hastings. Buchanan. H.O. 39
Lancaster. Royal Lancaster Infy. Reg. 40
Manchester R.H.B. Locum Reg. or Sr. H.O. 42
Nottingham. Highbury. Sr. H.O. .. 43
Perth Gen. Hosps. H.O. 43
Sheffield R.H.B. Sr. Reg. 45
Staines. Middx. Reg. 45
Stoke-on-Trent. North Staffs Royal Infy. Pre-reg. H.O. 45
Windsor. King Edward VII. H.O. .. 46
Worcester. Ronkswood. H.O. .. 47

OPHTHALMOLOGY

Birmingham & Midland Eye. H.O. .. 37
Birmingham (Selly Oak) Group. Reg. 37
Bradford. Royal Eye & Ear. H.O. .. 37
Brighton. Sussex Eye. H.O. .. 38
Liverpool United Hosps. Sr. H.O. .. 41
Manchester United Hosps. Sr. Regs. & Reg. 42
Stoke-on-Trent. North Staffs Royal Infy. Sr. H.O. 46
Wolverhampton Group. P.-t. Clin. Assts. 47

ORTHOPÆDICS

Fulham, W.6. Sr. H.O. 35
Hammersmith, W.12. Reg. 35
Prince of Wales's Gen., N.15. H.O. .. 35
Durham County Hosp. Sr. H.O. .. 39
East Cumberland H.M.C. Sr. H.O. .. 39
Grimsby Gen. Sr. H.O. or Locum .. 39
Hastings Group H.M.C. Locum Reg. 39
Ipswich. Borough Gen. Sr. H.O. .. 40
Ipswich. East Suffolk & Ipswich. H.O. 40
Leeds R.H.B. P.-t. Cons. 33
Leeds R.H.B. Regs. 40
Leeds United Hosps. Reg. & Sr. H.O. 41
Leeds. Woodlands (Orth.). Sr. H.O. 41
Liverpool. Walton. H.O. 41
Manchester United Hosps. Reg. .. 42
Newcastle upon Tyne H.M.C. Sr. H.O. 42
Newmarket Gen. Sr. H.O. 42
Nottingham Gen. Sr. H.O. or Locum 43
Perth Gen. Hosps. Sr. H.O.'s & H.O.'s 43
Peterborough Mem. Sr. H.O. .. 44
Plymouth. Mount Gold Orth. Sr. H.O. 43
Portsmouth Group H.M.C. Sr. H.O. 44
Shrewsbury. Royal Salop Infy. Sr. H.O. 44
Southampton. Royal South Hants. Sr. H.O. & H.O. 45
Southend Gen. Sr. H.O. 44
Wolverhampton Group. Sr. H.O. or H.O. 47
Yorkshire. East Riding H.M.C. H.O. 47
New Zealand. Otago Hosp. Board. Sr. Reg. 47

PÆDIATRICS

Hosp. for Sick Children, W.C.1. Sr. Reg. & Sr. H.O.'s 36
Paddington Green Child's., W.2. Pre-reg. H.O. 35
St. Mary's, W.2. Reg. 36
Cheltenham Gen. Eye & Child's. H.O. 38
Derby. Derbyshire Child's. Pre-reg. H.O. or Sr. H.O. & Sr. H.O. .. 39
East Anglian R.H.B. Reg. 39
Leeds United Hosps. Sr. H.O. .. 40
Portsmouth Group H.M.C. Reg. .. 44
Rochdale. Birch Hill. Sr. H.O. .. 44
Scotland. Western R.H.B. Sr. H.M.O. 34
Shrewsbury. Royal Salop Infy. Sr. H.O. or H.O. 44
Southampton Child's. H.O. 45
Wirral. Leasowe Child's. Sr. H.O. .. 46

PATHOLOGY

Elizabeth Garrett Anderson, N.W.1. H.O. 34
Royal Northern, N.7. Sr. H.O. .. 35
St. Mary's, W.2. Sr. H.O. 35
Birmingham United Hosps. Sr. H.O. & Reg. 37
Bury & Rossendale H.M.C. Sr. H.O. 38
Leeds United Hosps. Sr. H.M.O. .. 33
Newcastle R.H.B. Regs. 42
Northwood, Middx. Mount Vernon. Sr. H.O. 42
Plymouth. South Devon & East Cornwall Gen. Hosp. Group. Sr. H.O. 43
Welsh R.H.B. Cons. 34

PHYSICAL MEDICINE

Oxford R.H.B. P.-t. Cons. 33

PLASTIC SURGERY

Alton. Lord Mayor Treloar Orth. Locum Sr. H.O. 36

PSYCHIATRY

London, E.1. P.-t. Cons. 33
Chester. The Manor. P.-t. M.O. .. 38
Chesterfield H.M.C. Jr. H.M.O. .. 38
Coulsdon, Surrey. Netherne. H.O. or Sr. H.O. 38
East Anglian R.H.B. & United Cambridge Hosps. Reg. 39
Leeds R.H.B. Sr. H.M.O.'s 33
Leeds R.H.B. Regs. 40
Lichfield. St. Matthew's. Jr. H.M.O. 41
Lincoln. Lawn. Jr. H.M.O. 41
Portsmouth. St. James. Sr. Reg. .. 43
Sheffield R.H.B. Sr. H.M.O.'s 33/34
South West Met. R.H.B. Sr. H.M.O.'s 34
Sutton. Banstead. Jr. H.M.O. .. 46
Welsh R.H.B. Reg. 46
Yorkshire. East Riding H.M.C. H.O. 47

RADIOLOGY

North East Met. R.H.B. Cons. & Sr. H.M.O. 33
Birmingham R.H.B. Reg. 37
Croydon Group H.M.C. Reg. .. 38
Leeds United Hosps. Sr. Reg. & Reg. 40
Manchester R.H.B. Cons. 33
Manchester R.H.B. & United Hosps. Sr. Reg. 42
Scotland. Western R.H.B. Sr. H.M.O. 34
Sheffield United Hosps. Reg. .. 45

RADIOTHERAPY

Middlesex, W.1, & North West Met. R.H.B. Sr. Reg. 35
Leeds United Hosps. Sr. H.O. .. 40
Liverpool., Radium Inst. Jr. H.M.O. 41
Northwood. Mount Vernon. H.O. .. 42
Sheffield Nat. Centre for Radiotherapy. Reg. 45

RHEUMATOLOGY

Bath. Royal Nat. Hosp for Rheumatic Diseases. Sr. H.O. 36

SURGERY

Battersea Gen., S.W.11. Locum Jr. H.M.O. 34
Charing Cross Hosp. Group. Reg. .. 34
Elizabeth Garrett Anderson, N.W.1. H.O. 34
Hosp. for Sick Children, W.C.1. Sr. H.O.'s 36
Manor House, N.W.11. R.S.O. .. 35
Paddington Green Child's., W.2. Pre-reg. H.O. 35
Poplar, E.14. Pre-reg. H.O. 35
Princess Beatrice, S.W.5. Reg. .. 35
South London Hosp. for Women & Child., S.W.4. Reg. 35
St. Stephen's, S.W.10. Reg. 36
Willesden Gen., N.W.10. H.O. .. 36
Aberystwyth Gen. Pre-reg. H.O. .. 36
Ashford, Kent. Sr. H.O. 36
Ashford, Kent. Willesborough. H.O. 36
Barnstaple. North Devon Infy. Pre-reg. H.O. 36
Barrow-in-Furness. North Lonsdale. Sr. H.O. 36
Bedford Gen. Pre-reg. H.O. 36
Bexhill. Sussex. H.O.'s 36
Birmingham Accident Hosp. & Rehab. Centre. H.O.'s & Pre-reg. H.O. .. 37
Birmingham R.H.B. Regs. 37
Bolton Royal Infy. H.O. 37
Bradford. St. Luke's. H.O. 37
Cambridge. Addenbrooke's. Reg. .. 38
Canterbury. Kent & Canterbury. H.O. 38
Cardiff. Royal Hamadryad Gen. & Seamen's. Sr. H.O. 38
Chelmsford & Essex. Pre-reg. H.O. .. 38
Chelmsford. St. John's. H.O. .. 38
Chertsey. St. Peter's. Reg. 38
Chichester. Royal West Sussex. H.O. 38
Colchester Group H.M.C. H.O. .. 38
Darlington Mem. H.O. 39
Derby. Derbyshire Child's. Pre-reg. H.O. or Sr. H.O. 39
Derby. Derbyshire Royal Infy. Pre-reg. H.O. or Sr. H.O. 39
Dewsbury. Staincliffe Gen. H.O. .. 38
Dovercourt. Harwich & Dist. Sr. H.O. 39
Epsom Dist. H.O. 39
Folkestone. Royal Victoria. H.O. .. 39
Grimsby Gen. Reg. 39
Hillingdon, Middx. H.O. 40
Huddersfield Royal Infy. H.O.'s .. 40
Inverness Hosps. B.O.M. H.O. .. 40
Keighley & Dist. Victoria. H.O. .. 40
Leeds R.H.B. Regs. 40
Leeds United Hosps. Pre-reg. H.O. .. 40
Lincoln. County. H.O. 41
Llanelly. Jr. H.M.O.'s 41
Manchester R.H.B. Reg. 42
Manchester United Hosps. Sr. H.O.'s 41
Newbury Dist. Sr. H.O. 42
Newmarket Gen. H.O. 42
Newport, Mon. Royal Gwent. Sr. H.O. 42
Northallerton. Friarage. Pre-reg. H.O. 42
Northwood. Mount Vernon. H.O. .. 42
Nottingham Child's. Sr. H.O. & H.O. 43
Nottingham. City. Sr. H.O.'s. .. 43
Nottingham Gen. H.O.'s 43
Perth Gen. Hosps. H.O.'s 43
Plymouth Clinical Area. Cons. .. 33
Plymouth & Devonport. South Devon & East Cornwall. H.O.'s 43
Portsmouth Group H.M.C. Sr. H.O. 44
Reading. Royal Berks. H.O. .. 44
Romford. Vic. H.O. 44
Salisbury Gen. Reg. & Locum Reg. 44
Scotland. Western R.H.B. Sr. Reg. 44
Sheffield R.H.B. Sr. Reg. 45
Slough Upton. H.O. 45
Southampton. Royal South Hants. H.O. 45
South East Met. R.H.B. Sr. Reg. .. 45
Southport & Dist. H.M.C. Sr. H.O.'s 45
Southport & Dist. H.M.C. H.O.'s .. 45
Stockport & Buxton H.M.C. H.O. .. 45
Stoke-on-Trent. City Gen. Sr. H.O.'s & Pre-reg. H.O.'s 46
Stoke-on-Trent. North Staffs Royal Infy. H.O. 46
Warrington Gen. H.O. 46
Watford & Dist. Peace Mem. H.O. .. 46
Welsh R.H.B. Regs. 46
West Bromwich & Dist. Gen. H.O. .. 46
Weston-super-Mare Gen. H.O. .. 46
Wigan. Royal Albert Edward Infy. H.O. 46
Windsor. King Edward VII. H.O. .. 46
Wolverhampton Group. H.O. .. 47
Workington Infy. Pre-reg. H.O. or Sr. H.O. 46
Worthing. H.O. 47
Yorkshire. East Riding H.M.C. H.O.'s 47

UROLOGY

Hastings. Buchanan. Sr. H.O .. 39
Leeds United Hosps. Sr. H.O. .. 41
Scotland. Western R.H.B. Cons. .. 34

VENEREOLOGY

London. E.1. Sr. H.O. 35

GENERAL

Oxford United Hosps. H.O. or Sr. H.O. 43
New York. New Rochelle. Internes 47

PUBLIC APPOINTMENTS 47

GENERAL PRACTICE 48

MISCELLANEOUS 48

The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

EXAMINING BOARD IN ENGLAND

by the
ROYAL COLLEGE OF PHYSICIANS OF LONDON
and the
ROYAL COLLEGE OF SURGEONS OF ENGLAND

Notice is hereby given that the following Examinations will commence on the dates stated below :—

DIPLOMA IN LARYNGOLOGY AND OTOLOGY
DIPLOMA IN PSYCHOLOGICAL MEDICINE
10th June
CERTIFICATE AND DIPLOMA IN PUBLIC HEALTH
17th June
DIPLOMA IN MEDICAL RADIODIAGNOSIS
Part I.—24th June

Applications and fees for either or both Parts of an Examination must reach the Secretary, Examination Hall, Queen-square, London, W.C.1, at least 21 days before Part I of the Examination begins. FRANCIS M. STENT, Secretary.

UNIVERSITY OF LONDON

A COURSE OF 2 LECTURES on "Biochemical and Clinical Implications of Studies in Drug Metabolism" will be given by Dr. B. B. BRODIE (National Heart Institute, Maryland) at 5.30 P.M. on 17TH and 19TH MAY at Guy's Hospital Medical School, St. Thomas's-street, S.E.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF MANCHESTER

FACULTY OF MEDICINE

CERTIFICATE AND DIPLOMA IN PUBLIC HEALTH

The next COURSE covering 2 academic years will begin in OCTOBER, 1954. Candidates are required to obtain posts in the Manchester region from which they are permitted to attend the University for the equivalent of 2½ days each week of 6 academic terms. Every assistance is given to prospective candidates to obtain suitable employment.

Further particulars may be obtained from the Dean of Postgraduate Medical Studies, the University, Manchester, 13, to whom application to take the course should be made not later than Saturday, 5th June, 1954.

INSTITUTE OF SOCIAL PSYCHIATRY

Dr. J. L. MORENO (New York) will speak in the Hall of the Royal Society of Medicine on 17TH MAY at 8 P.M.

Subject : "Recent Advances in Sociometry."

All interested are welcome.

TANCRED'S STUDENTSHIPS

DIVINITY : MEDICINE : LAW
£100 p.a. each. For Men only

The Governors and Trustees of Tancred's Foundation propose to make their annual election of a Student in Physic at Gonville and Caius College, Cambridge, on the result of the Entrance examination to be held in JANUARY, 1955, required from candidates for admission to Gonville and Caius College, Cambridge, who intend to read medicine.

Candidates must have been born in England, Scotland or Wales, and be members of the Church of England and unmarried. Candidates must be within the ages of 17 years and 22 years on 1st October, 1955. The last day for sending in Petitions is 1st July, 1954.

Further announcements relating to the Divinity and Law Studentships awarded by this Foundation will appear in September, 1954, and February, 1955.

Apply for further particulars and form of Petition stating kind of Studentship and mentioning this paper to the Clerk, R. M. C. HOWARD, Esq., D.S.O., 28, Lincoln's Inn-fields, London, W.C.2.

THE FACULTY OF RADIOLOGISTS

The SKINNER LECTURE will be delivered by Dr. F. BACLESSE of the Fondation Curie, Paris, at the Royal College of Surgeons, Lincoln's Inn-fields, London, W.C.2, on FRIDAY, 21ST MAY, at 3.15 P.M.

Subject : "Radiotherapy in Cancer of the Breast."

The Lecture is open to all members of the medical profession.

THE ROYAL SOCIETY

SCIENTIFIC PUBLICATIONS GRANTS

Applications for grants from the first allotment of the Government Grant for Scientific Publications for the year 1954 should be made as soon as possible. No applications can be considered which are received later than 15TH JUNE, 1954. This grant is provided for the assistance of scientific publications in the United Kingdom, particularly but not exclusively those of scientific societies and institutions of a national character. A small part of the grant is available for the assistance of the libraries of scientific societies. Applications are receivable only from societies and institutions in the United Kingdom and individuals of British nationality.

Applications will be considered at the same time for grants from funds made available by the Wellcome Trust for the support of publications dealing with research in the field of medical and allied sciences.

Forms of application may be obtained from the Assistant Secretary, The Royal Society, Burlington House, London, W.1.

L.M.S.S.A.

FINAL EXAMINATION : SURGERY, 14th June, 12th July, 9th August, 1954. MEDICINE, PATHOLOGY, 21st June, 19th July, 16th August, 1954. MIDWIFERY, 22nd June, 20th July, 17th August, 1954. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.

(UNIVERSITY OF LONDON.) DEPARTMENT OF CHEMICAL PATHOLOGY. Applications are invited for the MILES AMES FELLOWSHIP IN ENDOCRINOLOGY. Candidates should hold a Ph.D. degree or its equivalent in chemistry or biochemistry. The successful candidate will be required to carry out original work on steroid hormones. Salary not less than £750 p.a., with superannuation.

Applications, with the names and addresses of 3 referees, should be submitted before 31st May, 1954, to the Secretary, King's College Hospital Medical School, Denmark-hill, London, S.E.5, from whom further particulars may be obtained.

NORTHERN GENERAL HOSPITAL, Edinburgh. Applications are invited for a RESEARCH FELLOWSHIP IN PATHOLOGY. The successful candidate will undertake research in the field of chronic rheumatic diseases and will be attached to the Department of Pathology, Edinburgh University, and to the Rheumatic Unit, Northern General Hospital. The appointment will be for 1 year in the first instance, but the Fellow will be eligible for reappointment. Salary £1000–£1300 depending on qualifications and experience. The scheme is supported by the Nuffield Foundation.

Applications, with names of 2 referees, to be sent to the Secretary, Northern Hospitals Group, Ferry-road, Edinburgh, 5, as soon as possible.

THE MEDICAL RESEARCH COUNCIL have a vacancy on their Scientific staff at the National Institute for Medical Research, Mill Hill, London, N.W.7. The work is to assist in developing tissue culture methods applicable to leprosy bacilli. Applicants (Male or Female) should have medical, veterinary or scientific qualifications with previous experience in bacteriology, but not necessarily in tissue culture. The appointment will be for 3 years in the first instance (subject to review after 1 year). The commencing salary will be determined by qualifications and experience, and will not exceed £750 p.a.

Applications, giving full personal particulars (including details of academic and postgraduate career and references to any scientific publications) and the names of 2 referees, should be sent to the Director.

GUY'S HOSPITAL MEDICAL SCHOOL. Applications are invited for a post of RESEARCH FELLOW for work in connection with clinical trials of certain drugs. The appointment, which is suitable for a person who has held a Registrar post and who wishes to spend a period doing investigative work, will be for a period of 1 year in the first instance. The salary will be up to £1000 p.a., depending on the experience of the person appointed.

Applications, with the names of 3 referees, should be sent to the Dean, Guy's Hospital Medical School, London Bridge, S.E.1, not later than 22nd May, 1954.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL. BACTERIOLOGY DEPARTMENT. ASSISTANT required, medically qualified, preferably with experience of bacteriology. Duties consist of teaching and research. Salary scale £700–£900 p.a. with superannuation benefits and children's allowance.

Applications should be made immediately to the Secretary, University College Hospital Medical School, University-street, W.C.1.

UNITED BRISTOL HOSPITALS. Applications are invited from registered medical practitioners for the post of RESEARCH ASSISTANT IN FLUID BALANCE (resident) in the Chemical Pathology Section of the Department of Pathology of the United Bristol Hospitals. The primary duties will consist of the study of abnormalities of blood volume in surgical patients and those with renal disease, and also of general fluid balance in acute surgical emergencies. Preference will be given to candidates with experience of laboratory procedures or of fluid balance control. The terms and conditions of the appointment will be those for a Senior Registrar or Registrar according to experience and qualifications. The appointment will be for 1 year in the first instance, starting not later than September, 1954.

Applications, giving full christian names, particulars of age, qualifications and experience, and the names of 2 referees, should be sent not later than 17th May, 1954, to Secretary to the Board, Royal Infirmary Branch, Bristol, 2.

UNIVERSITY OF LIVERPOOL. Department of Studies IN PSYCHOLOGICAL MEDICINE. Applications are invited for the post of RESEARCH ASSISTANT at a salary within the range £1000–£1200 p.a. according to the qualifications and experience of the successful candidate. The appointment will be tenable for 1 year and may be renewed for a second year.

Applications, stating age, academic qualifications, and experience, together with proposed subjects of research and the names of 3 referees, should be received not later than 1st June, 1954, by the undersigned, from whom further particulars may be obtained. STANLEY DUMBELL, Registrar.

THE UNIVERSITY OF MANCHESTER. Applications are invited from candidates with a medical qualification registrable in this country for the post of LECTURER IN OPHTHALMOLOGY. The successful candidate will be expected to carry out research in the University Department of Ophthalmology at the Manchester Royal Eye Hospital and to assist in the clinical work of this unit. Salary on a scale £700–£1800 with membership of F.S.S.U. and Children's Allowance Scheme : Initial salary according to qualifications and experience.

Applications should be sent not later than 19th June, 1954, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

THE UNIVERSITY OF LEEDS. Department of Pathology. Applications are invited from registered medical practitioners for appointment as either DEMONSTRATOR or LECTURER IN PATHOLOGY at a salary on the scale £600–£100–£800 for a Demonstrator or £1000–£100–£1500 for a Lecturer, according to qualifications and experience.

Applications (3 copies), stating date of birth, qualifications and experience, together with the names of 3 referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained), not later than 31st May, 1954.

THE UNITED LEEDS HOSPITALS. Applications are invited for the appointment of a RESEARCH FELLOW to undertake specific work in connection with Thoracic Surgery. Candidates should be medically qualified and, for preference, also hold a science degree. The appointment will be for 1 year in the first place, renewable on an annual tenancy. Commencing salary £1000 p.a.

Applications, giving full details of training and experience (with relevant dates), age, nationality, &c., and accompanied by the names and addresses of 3 referees, should reach the undersigned by 30th June, 1954. Further information is available on request.

J. A. TUNSTALL, Secretary to the Board of Governors.
The General Infirmary, Leeds, 1.

Hospital Services : Senior Appointments

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of CONSULTANT in Child Psychiatry. A higher qualification in general medicine is desirable and applicants should have had at least 5 years experience in child psychiatry and possess the Diploma of Psychological Medicine. The successful candidate would be required to attend on 4 half-days per week and would work under the administrative direction of the Physicians to the Department of Neurology and Psychiatry.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the House Governor by 31st May, 1954. H. BRIERLEY, House Governor.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

(1) Full-time ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grade), Dagenham Hospital, Essex. Resident post.

(2) Full-time ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer grade) at Edmonton Chest Clinic, N.9, and for 120 tuberculosis beds. The Clinic is closely associated with the Thoracic Surgery Unit at North Middlesex Hospital, N.18. Candidates should have good general medical experience and special experience in tuberculosis and diseases of the chest.

(3) Full or maximum Part-time CONSULTANT RADIOLOGIST, North Middlesex Hospital and Annexes, N.18. The successful candidate will be in administrative charge of the department.

(4) Full-time ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer grade), Southend-on-Sea Group of Hospitals with principal duties at Southend General Hospital.

Separate applications (6 copies), stating post concerned, and names of 3 referees, should reach the Secretary, 11A, Portland-place, London, W.1, by Saturday, 22nd May, 1954.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill a vacancy for a CONSULTANT ANÆSTHETIST (part-time 9 notional half-days a week) at the Greenwich and Deptford Group of hospitals. Candidates must have had wide experience in anæsthetics and hold the qualification of D.A. or F.F.A.R.C.S. Applicants may visit the hospitals concerned.

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 22nd May, 1954.

ST. THOMAS'S HOSPITAL, London, S.E.1. Physician to the Neurological Department. Consultant status with membership of the Medical Committee. 5 sessions per week.

Applications (12 copies), including names and addresses of 3 referees, to the Clerk of the Governors by 22nd May, 1954.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the appointment of Part-time CONSULTANT to the Department for Nervous Diseases. The successful candidate will be required to undertake 3 notional half-days per week with effect from 5th August, 1954, and will be expected to devote a further 1 or 2 notional half-days per week to the Department of Electro-encephalography.

Applications (10 copies), stating nationality, date of birth, permanent address, qualifications, with dates and details of present and previous appointments together with the names and addresses of 3 referees, should be sent, not later than 12th June, 1954, to ALAN POWDITCH, House Governor, from whom further information as to the particulars of this appointment may be obtained.

BIRMINGHAM (SELLY OAK) GROUP OF HOSPITALS. Whole-time CONSULTANT in Anæsthetics. Duties mainly at Selly Oak Hospital. Experience specialty and D.A. required.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 24th May, 1954.

LEEDS REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens ANÆSTHETIST in the Consultant or Senior Hospital Medical Officer grades required immediately for approximately 3 months for duties at hospitals in the York A and Tadcaster Group.

Applications, stating age, qualifications, and details of previous appointments with dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary to the Board, Park-parade, Harrogate.

LEEDS REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer scale) for duties at Menston Hospital, near Leeds (2500 Beds), and associated clinics at general hospitals in Bradford. A 4-bedroomed flat is available at the Hospital.

Applications (12 copies), stating age, qualifications, and details of appointments held, showing dates, with names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, not later than 5th June, 1954.

LEEDS REGIONAL HOSPITAL BOARD.

Part-time appointment (9 sessions per week) of CONSULTANT in Orthopædic Surgery for duties mainly at St. James's Hospital and The Public Dispensary, Leeds.

Whole-time appointment of a CONSULTANT NEUROLOGIST for duties in the Paraplegic Unit (9 sessions per week) and in the Neurological Department (2 sessions per week) at Pinderfields General Hospital, Wakefield. The Paraplegic Unit at this Hospital is to be extended so as to provide accommodation for approximately 40 patients.

Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer scale) for duties at Stanley Royd Hospital, Wakefield (2000 Beds), and Associated Clinics at Wakefield, Dewsbury and Pontefract General Hospitals. Accommodation is available for a single person.

2 Whole-time ASSISTANT PSYCHIATRISTS (Senior Hospital Medical Officers) for duties at Storthes Hall Hospital, Kirkburton, near Huddersfield (2500 Beds) and Associated Clinics at Huddersfield, Halifax and Dewsbury. Resident or non-resident. An unfurnished family flat is available if required and accommodation is also available for a single person.

Applications (12 copies), stating age, qualifications, and details of appointments held showing dates, with names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, not later than 31st May, 1954.

LEEDS. THE UNITED LEEDS HOSPITALS. The Board of Governors invites applications for the vacant post of SENIOR HOSPITAL MEDICAL OFFICER in Pathology for duties specially connected with obstetrics, gynæcology, and blood-transfusion work. The appointment will be whole-time.

Applications, giving age, nationality, qualifications, and full details of experience (with relevant dates), together with the names of 3 referees, should reach the undersigned by 22nd May, 1954. Canvassing any member of the Board or the Advisory Appointments Committee, whether directly or indirectly, will disqualify. J. A. TUNSTALL, Secretary to the Board.

The General Infirmary, Leeds, 1.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) Whole-time or maximum part-time post of Additional CONSULTANT ANÆSTHETIST to the Blackburn and District Hospitals (Blackburn Royal Infirmary, Queen's Park Hospital, Blackburn and Victoria Hospital, Accrington, &c.). Higher qualification in anæsthesia essential. Successful candidate to live in area.

(*b*) Whole-time post of CONSULTANT RADIOLOGIST in charge of the diagnostic radiology services in the Lancaster and Kendal Hospital Centre (Royal Lancaster Infirmary, Queen Victoria Hospital, Morecambe, and Westmorland County Hospital, Kendal, &c.) and neighbouring mental hospitals. Wide experience and higher qualifications essential; appointee to live in area.

Application forms from the Senior Administrative Medical Officer to the Board at Cheetwood-road, Manchester, 8, to be returned by 28th and 25th May, 1954, respectively.

NEWCASTLE REGIONAL HOSPITAL BOARD. SEDGEFIELD HOSPITAL MANAGEMENT COMMITTEE. SEDGEFIELD GENERAL HOSPITAL. (370 Beds.) SENIOR CONSULTANT ANÆSTHETIST, whole-time, or part-time for a minimum of 9 notional half-days per week. Salary scale £1700–£2750 whole-time pro rata part-time. A new unfurnished semi-detached house is available on a rental basis.

Applications, together with names and addresses of referees (preferably), or testimonials, to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 28 days.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the post of CONSULTANT in Physical Medicine to the hospitals of the Reading and District Hospital Management Committee in charge of a closed department. The post will be part-time for 9 half-days. Candidates must have had experience of in-patient rehabilitation and should possess a higher qualification. The successful candidate will be required to live in the neighbourhood of Reading. Candidates are invited to visit the hospitals by arrangement with the Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

Applications (12 copies), stating age, qualifications, experience, and the names and addresses of 3 referees, should be sent to the Secretary, Oxford Regional Hospital Board (from whom further details may be obtained), 43, Banbury-road, Oxford, by 4th June, 1954.

PLYMOUTH CLINICAL AREA. South-Western Regional HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of a CONSULTANT SURGEON to the Plymouth Clinical Area which comprises Plymouth, Kingsbridge, Tavistock, Launceston, Bude and Liskeard. The appointment may be held either on a whole-time or maximal (9 sessions) part-time basis. Applicants should have had wide experience in general surgery. The successful candidate will have charge of beds at the South Devon and East Cornwall Hospital, Plymouth, and will be required to visit other hospitals in the Clinical Area as may be determined by the Regional Board from time to time.

Applications (12 copies), stating date of birth, qualifications and experience, together with 12 copies of 2 testimonials, and the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 29th May, 1954.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR ASSISTANT PSYCHIATRIST required for the Coppice Hospital, Mapperley, Nottingham. Salary scale £1300–£50–£1750. A house, now being built, will be available on completion.

Application forms and further details obtainable from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 5th June, 1954.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR ASSISTANT PSYCHIATRIST required for the Lawn Hospital, Lincoln. Salary scale £1300–£50–£1750. A flat is available.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 5th June, 1954.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SENIOR ASSISTANT PSYCHIATRIST required for Bracebridge Heath Hospital, near Lincoln. Salary scale £1300–£50–£1750. A modern self-contained flat is available.

Application forms and further details obtainable from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10, to be returned by 5th June, 1954.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT ANÆSTHETIST required for the Lincoln County Hospital. Salary scale £1300–£50–£1750. Candidates should possess the D.A.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 5th June, 1954.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for appointment as Part-time CONSULTANT ANÆSTHETIST to undertake 5 notional half-days a week in the Mid-Kent Group of hospitals. Candidates must have had wide experience in anæsthetics and hold the qualification of D.A. or F.F.A.R.C.S. Applicants may visit the hospitals concerned.

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 22nd May, 1954.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill a vacancy for a Whole-time CLINICIAN in Tuberculosis at the Royal Sea Bathing Hospital, Margate, where there are pulmonary and non-pulmonary tuberculosis beds, including a few for urological cases. There is also a small non-tubercular Orthopædic Unit. The duties will include day-to-day care of patients, supervised by visiting Consultants, and the successful candidate will be expected to devote 2/11ths of his time to medical administrative duties. Wide experience in all branches of tuberculosis is essential and the possession of a higher medical or surgical qualification is desirable. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales) on a salary scale £1300–£50–£1750. Candidates may visit the Hospital concerned.

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 22nd May, 1954.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Coldharbour M.D. Hospital, Sherborne, Dorset, in the Coldeast and Tatchbury Mount Group. Candidates should have D.P.M. and experience in psychiatry and hospital administration. Successful candidate will take part in the work of the Group in general and will have opportunities of participating in other local psychiatric services. 7-roomed bungalow available on estate if desired. If non-resident, person appointed will be required to live near Hospital.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 29th May, 1954. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Warlingham Park Hospital, Warlingham, Surrey, which serves the County Borough of Croydon. Candidates should have D.P.M. and experience of both inpatient and outpatient work, including child psychiatry. Unfurnished house available, if required.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 29th May, 1954. Applicants may visit Hospital by local arrangement.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time ASSISTANT PÆDIATRICIAN for the Pædiatric Service of Ayrshire and Dumfriesshire. The person appointed would be required to reside in the vicinity of Dumfries. Salary on the scale £1300–£50–£1750. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of DEPUTY GROUP MEDICAL SUPERINTENDENT, Glasgow Royal Infirmary and Associated Hospitals. Salary on the scale £1200–£66 13s. 4d.–£1400. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments:—

CONSULTANT ANÆSTHETIST based at the Western Infirmary, Glasgow, and with duties also at the Royal Maternity Hospital, Glasgow, Royal Hospital for Sick Children, Glasgow, and Bridge of Weir Sanatorium, or otherwise as may be arranged. The appointment will be part-time and remunerated on the basis of 9 notional half-days per week, and some familiarity with anæsthesia associated with thoracic surgery may be an advantage.

CONSULTANT UROLOGIST in charge of wards at the Western Infirmary, Glasgow. The appointment will be part-time and remunerated on the basis of 7 notional half-days per week. The successful applicant will be required to take up duty on 1st October, 1954.

Whole-time ASSISTANT RADIOLOGIST based at Kilmarnock Infirmary with duties in other hospitals administered by the Boards of Management for Northern and Southern Ayrshire Hospitals. Salary on the scale £1300–£50–£1750.

Whole-time ASSISTANT TUBERCULOSIS PHYSICIAN at the Dumfries and Galloway Sanatorium, Lochmaben. Salary on the scale £1300–£50–£1750.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies) stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, not later than 30 days after the publication of this advertisement.

WELSH REGIONAL HOSPITAL BOARD.

CONSULTANT PATHOLOGIST, based at Llanelly Hospital. A higher qualification in pathology or medicine desirable. Optional whole-time or maximum part-time appointment.

Whole-time ASSISTANT ANÆSTHETIST (Senior Hospital Medical Officer) based at Neath General Hospital. Possession of D.A. an advantage. The successful candidate will work under direction of the Consultant in Charge.

Applications (12 copies) to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

DUBLIN. ST. LAURENCE'S HOSPITAL. The Board of Governors invite applications for the post of HONORARY DENTAL SURGEON to the above Hospital.

Applications should reach the undersigned on or before 31st May, 1954.

A. W. MACDERMOTT, Secretary and Superintendent.

Hospital Services : Junior Appointments

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. HOUSE PHYSICIAN (resident), vacant mid-June, 1954.

Apply Hospital Secretary (L), enclosing copies of 2 recent testimonials.

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. Locum RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer grade), resident or non-resident. 19th May–8th June, 1954.

Apply Hospital Secretary (L), BATtersea 0134.

CHARING CROSS HOSPITAL GROUP. Applications are invited for the post of SURGICAL REGISTRAR (resident), tenable at Wembley Hospital for 1 year in the first instance from 1st June, 1954. Salary and conditions in accordance with terms of service of hospital medical staff and subject to deduction for board-residence.

Applications, with copies of testimonials, should be sent to the undersigned as soon as possible.

FRANK HART, Secretary to the Board.

Charing Cross Hospital, London, W.C.2.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st July, 1954. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 12th May, 1954.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE PHYSICIAN for Medicine and Pædiatrics, to become vacant 1st July, 1954. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 12th May, 1954.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE SURGEON. Appointment for 6 months from 1st July, 1954. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 12th May, 1954.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered Women medical practitioners for the post of RESIDENT ASSISTANT PATHOLOGIST. Salary in accordance with the Ministry of Health scale for House Officers. The appointment is for 6 months in the first instance, duties to commence 1st July, 1954.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 12th May, 1954.

FULHAM HOSPITAL, St. Dunstan's-road, Hammersmith, W.6. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE SURGEON to the Orthopædic Department. Resident post. Vacant immediately. Post recognised for F.R.C.S. Candidates may visit the Hospital by arrangement with the Physician-Superintendent.

Applications to be submitted by 17th May, 1954, on forms obtainable from the Hospital Secretary. (L.184.)

GUY'S HOSPITAL, S.E.1. Applications are invited for the appointment of THORACIC SURGICAL REGISTRAR (whole-time, Senior Registrar grade). Duties to commence on 1st June, 1954.

Forms of application, obtainable from the Superintendent, Guy's Hospital, should be forwarded not later than 19th May, 1954.

HACKNEY HOSPITAL, London, E.9. (General—844 Beds.) Applications from registered medical practitioners for the posts of HOUSE OFFICERS (casualty) (1 with additional duties in the Skin Department and 1 with additional duties in the E.N.T. Department), should be sent as soon as possible to the Group Secretary at the above address.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (orthopædics) required.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by ' th May.

INVALID AND CRIPPLED CHILDREN'S HOSPITAL, 119, Balaam-street, London, E.13. RESIDENT HOUSE OFFICER (fully registered) for 6 months appointment from 22nd June. 36 Beds for medical, surgical and E.N.T. cases. Post very suitable for an applicant engaged in postgraduate study.

Apply by 19th May, with copies of testimonials, to Group Secretary West Ham Group Hospital Management Committee, Stratford, E.15.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of SENIOR HOUSE OFFICER to the Department of Venereal Diseases becoming vacant on 1st June, 1954.

Applications (6 copies), together with 6 copies of 3 recent testimonials, should be received by the House Governor by 15th May, 1954. H. BRIERLEY, House Governor.

MANOR HOUSE HOSPITAL, Golders Green, N.W.11 (exempted from National Health Service). Required, RESIDENT SURGICAL OFFICER (Male). Salary £700 p.a., less £100 p.a. deducted for emoluments. 6 months appointment, renewable.

Applications, stating age, nationality, qualifications, and surgical or orthopædic experience, with copies of 3 recent testimonials, to Mr. W. F. PENDRILL, Secretary.

MIDDLESEX HOSPITAL AND NORTH WEST METRO-POLITAN REGIONAL HOSPITAL BOARD. Applications invited for the post of SENIOR REGISTRAR in the Department of Radiotherapy at The Middlesex Hospital, W.1. Appointment until 31st December, 1954, renewable. If so required, part of the total tenure of the appointment will be in the Radiotherapy Department at Mount Vernon Hospital, Northwood, under the control of the North West Metropolitan Regional Hospital Board.

Forms of application obtainable from the Deputy Superintendent, The Middlesex Hospital, and should be returned, naming 3 referees, by 20th May.

MOTHERS' HOSPITAL (Salvation Army), Clapton, E.5. (Maternity—110 Beds. Recognised for M.R.C.O.G.) Applications are invited for the 12 months appointment of JUNIOR OBSTETRIC REGISTRAR (Senior House Officer grade) as from early June and should be sent in full detail with copy testimonials to the Group Secretary, Hospital Management Committee, Hackney Hospital, London, E.9, quoting reference MH/SHO.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. HOUSE OFFICER (resident), medical or surgical, to the Neurosurgical Department at Maida Vale Hospital for Nervous Diseases, London, W.9. Appointment in the first instance for 6 months from 1st June, 1954. Grading as Senior House Officer or Registrar according to experience.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary at Maida Vale Hospital, W.9, as soon as possible.

NORTH LONDON BLOOD TRANSFUSION CENTRE, Deansbrook-road, EDGWARE. JUNIOR HOSPITAL MEDICAL OFFICER for full-time duties with mobile teams at donor sessions. Opportunity for training in clinical pathology exists.

Applications, giving age, qualifications, experience, and names of 2 referees, to Director not later than 15th May, 1954.

PADDINGTON GREEN CHILDREN'S HOSPITAL, W.2. (ST. MARY'S HOSPITAL.) Applications are invited for the post of HOUSE PHYSICIAN (House Officer 2). Pre-registration post, vacant 1st June, 1954. Tenable for 6 months.

Applications, stating age, nationality, qualifications with dates and experience, with copies of 3 recent testimonials, should reach the Secretary not later than 15th May, 1954.

PADDINGTON GREEN CHILDREN'S HOSPITAL, W.2. (ST. MARY'S HOSPITAL.) Applications are invited for the post of HOUSE SURGEON (House Officer 1). Pre-registration post, vacant 1st June, 1954. Tenable for 6 months.

Applications, stating age, nationality, qualifications with dates, and copies of 3 testimonials, should reach the Secretary not later than 19th May, 1954.

POPLAR HOSPITAL, East India Dock-road, E.14. (120 Beds.) Required, HOUSE PHYSICIAN (Senior House Officer grade). Duties include inpatient, outpatient, and casualty work. Post vacant 1st June, 1954.

Applications, stating age, nationality, and qualifications, to the Group Secretary, Bow Group Hospital Management Committee, 2A, Bow-road, London, E.3.

POPLAR HOSPITAL, East India Dock-road, E.14. (120 Beds.) Required, HOUSE SURGEON. Duties include inpatient, outpatient and casualty work. Post pre-registration and recognised for F.R.C.S. Vacant 1st June.

Applications, stating age, nationality and qualifications, to the Secretary.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (219 Beds.) TOTTENHAM GROUP HOSPITAL MANAGEMENT COMMITTEE (GROUP 4). Applications are invited from registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE PHYSICIAN (third post) for a period of 6 months, vacant 2nd July.

Application form from Secretary, to be returned by 15th May, 1954.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (219 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT HOUSE SURGEON to Orthopædic, Fracture and Traumatic Department, E.N.T. Department, and SENIOR CASUALTY OFFICER (second or third post) for a period of 6 months, now vacant.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. (219 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER RESIDENT SENIOR HOUSE SURGEON for Casualty, for a period of 6 months, vacant 25th May.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

PRINCESS BEATRICE HOSPITAL, Earls Court, S.W.5. SURGICAL REGISTRAR (general surgery), non-resident.

Application forms from the Group Secretary, St. Luke's Hospital, Sydney-street, Chelsea, S.W.3. (Enclose foolscap stamped addressed envelope.)

ROYAL NATIONAL THROAT, NOSE AND EAR HOS-PITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1. Applications are invited for the following posts :—

REGISTRAR. The appointment will be for an initial period of 1 year and otherwise in accordance with the terms and conditions of service in the National Health Service. Applicants should have had considerable clinical experience in general surgery and in this specialty and they should hold a higher surgical qualification.

SENIOR HOUSE OFFICER. The appointment will be for an initial period of 6 months and otherwise in accordance with the terms and conditions of service in the National Health Service. Applicants should have good clinical experience in general surgery and in this specialty and they should preferably hold a higher surgical qualification or have passed the Primary F.R.C.S. examination.

Applications for either post should give full information as to qualifications and experience, with the names of 2 referees, and should be sent to the House Governor before 31st May, 1954.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Appli-cations are invited for the post of RESIDENT SENIOR HOUSE OFFICER (pathology) for Group Laboratory, vacant 16th June, 1954.

Applications to be sent to the Hospital Secretary by 18th May, 1954.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Appli-cations are invited for the post of HOUSE PHYSICIAN, vacant 15th June, 1954. Preference will be given to pre-registration candidates.

Applications to be sent to the Hospital Secretary by 18th May, 1954.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from registered Women medical practitioners for the post of SURGICAL REGISTRAR at the above Hospital. The post is vacant on 7th June, 1954, and is resident or non-resident by arrangement. Canvassing will disqualify but candidates are not precluded from visiting the Hospital.

For forms of application apply (enclosing stamped addressed envelope) to the Secretary, Lambeth Group Hospital Management Committee, Renfrew-road, S.E.11, to whom completed forms should be returned not later than 28th May, 1954.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of OBSTETRIC HOUSE SURGEON. (Post recognised for the M.R.C.O.G.) Appointment is for a period of 6 months and is vacant on 25th July, 1954.

Forms of application from the Secretary.

ST. MATTHEW'S HOSPITAL, Shepherdess-walk, London, N.1. CENTRAL GROUP HOSPITAL MANAGEMENT COMMITTEE. Chronic Sick Hospital (Geriatric Unit—320 Beds). SENIOR HOUSE OFFICER (Male or Female) required for the above Hospital which has an active Rehabilitation Unit. Resident Medical staff consists of a Senior Hospital Medical Officer, a Registrar, and a Senior House Officer. Consultants visit regularly. The Hospital possesses most facilities for investigation and diagnosis.

Apply to the Medical Superintendent by 29th May, 1954.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST. Applicants should have held 2 House Officer appointments at this Hospital or another general hospital approved by the Board of Governors, and preference will be given to those intending to specialise in pathology. The successful candidate will be required to take up his duties on 1st July, 1954 ; remuneration to be at Senior House Officer rate.

Applications, stating nationality, date of birth, permanent address, qualifications with dates and details of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 26th May, 1954.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of REGISTRAR to the Paediatric Department at St. Mary's Hospital. Previous experience in paediatrics is necessary; preference will be given to candidates holding the M.R.C.P. The successful candidate will be required to undertake duties in the Paediatric Unit at St. Mary's Hospital as well as at the Constituent Children's Hospitals. The appointment will be for a first period of 12 months, with effect from 1st July, 1954; the holder being eligible for reappointment; remuneration at Registrar rate.

Applications, stating nationality, date of birth, permanent address, qualifications with dates and details of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 27th May, 1954.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of HOUSE SURGEON (resident) in the grade of Senior House Officer to the Department of Neurosurgery at Atkinson Morley's Hospital, Wimbledon. The successful candidate will be required to take up duty as soon after 31st July, 1954, as possible.

Applications, giving details of age, education, qualifications, experience and the names of 2 referees, should be received by the undersigned not later than 5th June, 1954.

P. H. CONSTABLE, House Governor.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. Surgical REGISTRAR (whole-time), non-resident. Post recognised for F.R.C.S. Immediate vacancy.

Application forms from Group Secretary, St. Luke's Hospital, Chelsea, S.W.3 (enclose foolscap stamped addressed envelope).

ST. THOMAS'S HOSPITAL, London, S.E.1. Obstetric HOUSE PHYSICIAN at the General Lying-in Hospital, York-road, S.E.1, commencing 17th June. Approved service from M.R.C.O.G.

Applications, including names and addresses of 2 referees, to the Clerk of the Governors by 17th May.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy in September, 1954, for a MEDICAL REGISTRAR AND PATHOLOGIST (Senior Registrar). After 2 years at Great Ormond-street the successful candidate will probably be seconded to Uganda to work in paediatrics for a period of 2 years under the new Great Ormond-street liaison scheme with the Uganda Medical Service. After this period he will return to Great Ormond-street for a further year.

Full particulars and form of application, which must be returned not later than Tuesday, 8th June, 1954, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 8th September, 1954, for an ASSISTANT RESIDENT MEDICAL OFFICER (grade—Senior House Officer) at the Country Branch Hospital, Tadworth, Surrey (101 Beds).

Further particulars and form of application, which must be returned not later than Tuesday, 8th June, 1954, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies for the following Senior House Officers:—

2 HOUSE PHYSICIANS on 15th July, 1954.
2 HOUSE PHYSICIANS on 15th October, 1954.
2 HOUSE SURGEONS on 15th July, 1954.
1 HOUSE SURGEON on 15th October, 1954.
1 HOUSE PHYSICIAN to the Neurological and Neurosurgical Department on 1st October, 1954.

Further particulars and form of application, which must be returned not later than 8th June, 1954, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. Applications invited for following appointments:—

Whole-time NON-RESIDENT REGISTRAR (anæsthetics) required end July.

HOUSE OFFICER to Special Departments (paediatric, E.N.T., ophthalmic, skin, dental) required as soon as possible.

Applications, stating age, qualifications, experience, names of 2 referees (copies of 2 recent testimonials for House Officer), to Secretary by 15th May.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. RESIDENT HOUSE SURGEON required for 6 months from 15th June, 1954, plus 2 weeks locum from 1st June, 1954. Pre-registration candidates eligible.

Applications to Hospital Secretary by 19th May, 1954.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics and Gynæcology for 1 year from 1st June, 1954, for duties in Aberdeen Royal Infirmary, Aberdeen Maternity Hospital, and Woodend General Hospital.

Applications, stating age and qualifications with dates, and details of experience, together with the names of 2 persons to whom reference can be made, or 2 recent testimonials, to the Group Secretary, Aberdeen General Hospitals, 62, Queen's-road, Aberdeen.

ALTON. LORD MAYOR TRELOAR ORTHOPÆDIC HOSPITAL. (350 Beds.) Required, Locum SENIOR HOUSE OFFICER for Plastic Unit for May and June, 1954.

Write to Medical Superintendent.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE OFFICER (Male) for general medical and surgical duties.

Applications, stating age, qualifications and experience with copies of up to 3 recent testimonials, to Medical Director of Hospital.

ASHFORD HOSPITAL, Ashford, Kent. Applications are invited for the appointment of SENIOR HOUSE SURGEON at the above Hospital. Applicants should have held at least 3 hospital posts. The appointment will be tenable for a year. Salary £670 a year, less a deduction of £150 a year for residential emoluments.

Applications, stating age, qualifications and the names and addresses of 2 referees, should be made to the Group Secretary, "Ash-Eton," Radnor Park West, Folkestone.

ASHFORD HOSPITAL, Ashford, Kent. Applications are invited for the appointment of RESIDENT HOUSE SURGEON (casualty and orthopædics) at the above Hospital. Salary £350, £400, or £450 a year, according to experience. A deduction of £100 a year will be made in respect of residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, to the Group Secretary, "Ash-Eton," Radnor Park West, Folkestone.

ASHFORD (near), KENT. WILLESBOROUGH HOSPITAL. Applications are invited for the appointment of HOUSE SURGEON at the above Hospital. Good experience in general surgery with some casualty work. Salary £350, £400, or £450 a year, less £100 a year for residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, should be forwarded to the Group Secretary, "Ash-Eton," Radnor Park West, Folkestone.

ABERYSTWYTH. GENERAL HOSPITAL. (Hospital recognised for F.R.C.S. examination.) MID-WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from newly qualified medical practitioners seeking pre-registration posts under the Medical Act, 1950, for the resident post of HOUSE SURGEON at the above Hospital. Busy General Hospital. Salary on national scale, less deduction for board and lodging.

Applications, with 2 testimonials, to the Group Secretary, Mid-Wales Hospital Management Committee, General Hospital, Aberystwyth, immediately.

AYLESBURY. ROYAL BUCKINGHAMSHIRE AND ASSOCIATED HOSPITALS MANAGEMENT COMMITTEE.

Stoke Mandeville Hospital

SENIOR DENTAL HOUSE OFFICER in the Department of Plastic Surgery and Jaw Injuries at Stoke Mandeville Hospital. Accommodation will be available in the Medical staff quarters.

Applications, together with 2 copies of 2 recent testimonials, to the Administrative Officer.

Tindal General Hospital

HOUSE PHYSICIAN (Chest Unit), Male or Female. Pre-registration post, but registered practitioners invited to apply. Vacant 5th July, 1954. Duties include care of about 25 chest cases (including T.B. chalets), and 4 clinics weekly, including refills, forming a progressive chest unit for the Aylesbury area. Instruction in bronchoscopy and bronchography given. An acute Geriatric Unit (27 Beds), and a medical Outpatient Clinic provide general medical experience. No casualty department.

Please apply with 2 testimonials to the Administrative Officer as soon as possible.

BARNSLEY. BECKETT HOSPITAL. Senior House OFFICER (E.N.T. and ophthalmic) required for the above Hospital.

Apply to Group Secretary, Barnsley Hospital Management Committee, 33, Gawber-road, Barnsley.

BARNSTAPLE. NORTH DEVON INFIRMARY. (Central Group Hospital of 110 Beds.) HOUSE SURGEON (pre-registration) required for duty mid-July.

Applications to Group Secretary, 19, Alexandra-road, Barnstaple.

BARROW-IN-FURNESS. NORTH LONSDALE HOSPITAL. BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a post of SENIOR HOUSE SURGEON at the North Lonsdale Hospital, Barrow-in-Furness; post recognised for F.R.C.S. National conditions and salary scale.

Applications to Group Secretary, 52, Paradise-street, Barrow-in-Furness.

BATH. ROYAL NATIONAL HOSPITAL FOR RHEUMATIC DISEASES. Applications invited from medical practitioners for post of HOUSE PHYSICIAN (Senior House Officer grade) at above Hospital, attached to which is the Rheumatism Research Unit of South Western and Oxford Regions. Hospital is recognised for Part II of Diploma in Physical Medicine.

Applications, stating age, qualifications and experience, with 3 testimonials should be forwarded to—

J. LAWRENCE MEARS, Secretary,
Bath Hospital Management Committee,
Manor Hospital, Bath.

BEDFORD GENERAL HOSPITAL. (437 Beds.) Resident HOUSE SURGEON (pre-registration) required 20th May. The appointment offers exceptional opportunity for general experience in a busy acute Surgical Unit.

Applications, stating age, nationality, qualifications, previous appointments, together with copies of 2 testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEXHILL, SUSSEX. BEXHILL HOSPITAL. (62 Beds.) 2 HOUSE SURGEONS. Posts now vacant. A small modern hospital on the South Coast, considerable acute surgical work and busy Outpatient Department, excellent all-round experience. National scale of salary.

Apply to Hospital Administrator.

BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL, Edmund-street, BIRMINGHAM, 3. Required, SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience.

Detailed applications, with copies of 2 recent testimonials, to the Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM AND MIDLAND EYE HOSPITAL, Church-street, BIRMINGHAM, 3. HOUSE SURGEON required. Post vacant during May. Appointment is for 6 months, but renewable. Hospital carries resident staff of 5 and provides a 2-year course of instruction, which is recognised for the D.O. (England) and F.R.C.S. (England) in Ophthalmology. Wide experience available in all branches, including surgery.

Detailed applications to Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM ACCIDENT HOSPITAL AND REHABILITATION CENTRE, Bath-row, BIRMINGHAM, 15. (215 Beds.) HOUSE SURGEONS (Male or Female). Posts vacant immediately, including 1 for Pre-registration Service. Recognised for F.R.C.S. The appointments will be for a period of 6 months, of which 2 may be spent in the Burns Unit (Medical Research Council). The Hospital is the largest Traumatic Unit in the country, and treats 50,000 new patients each year. Posts are open to registered practitioners and offer ample opportunity for practical experience in the management of all types of injury and teaching by the Consultant staff.

Applications to the Administrator.

BIRMINGHAM (SELLY OAK) GROUP. Registrar (resident) in Ophthalmology. Selly Oak Hospital (Outpatients) and Little Bromwich Hospital (28 Beds). Experience specialty essential. Higher qualification desirable.

Application forms from Group Secretary, Oak Tree-lane, Birmingham, 29, to be returned before 31st May, 1954. Candidates may visit hospitals.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

1. **Birmingham (Dudley Road) Hospital Management Committee, Dudley Road Hospital, Birmingham**

(*a*) RESIDENT SURGICAL REGISTRAR at St. Chad's Hospital (50 general surgical beds). Recognised for F.R.C.S. Higher qualification an advantage. Married accommodation.

(*b*) RESIDENT REGISTRAR in E.N.T. Surgery required mid-June. Post recognised for D.L.O. and F.R.C.S.

2. **Herefordshire Group of Hospitals, Victoria House, Eign-street, Hereford**

Whole-time REGISTRAR in General Surgery. Duties mainly at General (154 Beds—71 surgical beds including fracture and orthopædic) and County (310 Beds—40 surgical) Hospitals, Hereford. Post recognised for F.R.C.S. Resident.

3. **Wolverhampton Group Hospital Management Committee, The Royal Hospital, Wolverhampton**

(*a*) CASUALTY OFFICER (Registrar) at Royal Hospital, Wolverhampton (310 Beds). Recognised for F.R.C.S. Resident.

(*b*) RESIDENT SURGICAL REGISTRAR for New Cross Hospital (636 Beds), with some duties at The Royal Hospital (310 Beds). Preferably F.R.C.S. Vacant now.

(*c*) REGISTRAR in Diagnostic Radiology for The Royal Hospital. Vacant now. At least Part I of Diploma of Medical Radiology essential. Duties also at other Group Hospitals.

4. **West Bromwich and District Hospital Management Committee, West Bromwich and District Hospital, Edward-street, West Bromwich**

Whole-time REGISTRAR in General Surgery. Duties in Casualty Department. Opportunity to deputise for Resident Surgical Officer in general surgery work. Post recognised for F.R.C.S. Experience specialty required. Resident.

Application forms from Group Secretaries, to be returned before 24th May. Candidates may visit hospitals.

BIRMINGHAM REGIONAL HOSPITAL BOARD. BIRMINGHAM (SELLY OAK) HOSPITAL MANAGEMENT COMMITTEE. BIRMINGHAM ACCIDENT HOSPITAL (209 Beds.) SURGICAL REGISTRAR. Duties in Burns Unit. Experience general possession surgery essential. Experience plastic surgery and of higher surgical qualification an advantage.

Application forms from Group Secretary, Oak Tree-lane, Birmingham, 29, to be returned before 22nd May, 1954. Candidates may visit Hospital.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the posts of RESIDENT REGISTRAR in Anæsthetics for duties within the Teaching Group, and resident at the Queen Elizabeth Hospital or at the Children's Hospital. The appointments are tenable for 1 year in the first instance. Preference will be given to candidates who have passed Part I, D.A., or Primary F.F.A.R.C.S.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer grade) for duties within the Teaching Group and resident at the Queen Elizabeth Hospital. The post will be vacant on 1st July, 1954, and tenable for 1 year. The appointment is recognised for the purpose of taking the F.F.A.R.C.S. examinations.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer) in the Department of Bacteriology and Clinical Pathology. This officer will act as 1 of 3 blood bank officers in addition to routine work in the department. Previous experience in clinical pathology is not essential but applicants should have had hospital postgraduate experience. The appointment is tenable for 1 year; vacant 1st June, 1954. Further particulars can be obtained from the Director of Clinical Pathological Services.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of RESIDENT REGISTRAR in Clinical Pathology (Registrar grade) for duty in the Department of Bacteriology and Clinical Pathology. The post is tenable for 1 year in the first instance, vacant 1st July, 1954.

Forms of application may be obtained from and should be returned as soon as possible to the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS, THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the post of NON-RESIDENT MEDICAL REGISTRAR to commence duty on 1st June or earlier. M.R.C.P. and/or D.C.H. preferred.

Application forms to be obtained from the House Governor and returned immediately.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (790 Beds.) SENIOR HOUSE OFFICER ANÆSTHETIST required (resident), duties and a possible period of residence also at other hospitals in Group. Extensive experience not necessary. Appointment recognised for training for Diploma in Anæsthetics and F.F.A.R.C.S. Duties include list and emergency work in general surgery, gynæcology, obstetrics and E.N.T.

Detailed applications to Secretary.

BIDEFORD AND DISTRICT HOSPITAL, North Devon. (51 Beds.) HOUSE OFFICER post vacant 3rd July, 1954. Flat available for married officer.

Applications to Group Secretary, 19, Alexandra-road, Barnstaple.

BOLTON. THE ROYAL INFIRMARY. (237 Beds.) BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE SURGEON for general surgical duties, vacant 23rd May, tenable for 6 months and recognised under the Pre-registration Service Scheme.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, should be sent immediately to H. P. TRAVIS, Group Secretary.

The Royal Infirmary, Bolton.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT MEDICAL OFFICER (Senior House Officer grade), tenable for 12 months. The successful candidate will be required to reside at the Hulton Hospital (144 Beds) and the duties will include responsibility for infectious diseases and dermatological cases at the Hospital, together with some tuberculosis and general surgical cases, and may include medical or pædiatric outpatient and inpatient experience in the general hospitals of the Group. Previous pædiatric experience would be an advantage, but is not essential. Married quarters may be provided by arrangement, if required, at an agreed charge.

Applications, stating age, nationality, qualifications, experience, and the names of 2 referees, should be sent immediately to H. P. TRAVIS, Group Secretary.

The Royal Infirmary, Bolton.

BRADFORD ROYAL INFIRMARY. House Officer (anæsthetics), vacant now. Recognised for D.A. and F.F.A.R.C.S. Opportunities for plastic and intra-thoracic experience. Salary according to Whitley Council (MDB) rates.

Applications, stating age, experience, nationality, and qualifications, with copy testimonials, to Secretary.

BRADFORD ROYAL INFIRMARY. Senior House Officer (general medicine and clinical pathology), vacant 1st June. Salary according to Whitley Council (MDB) scales.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary.

BRADFORD. ROYAL EYE AND EAR HOSPITAL. HOUSE SURGEON (ophthalmology), vacant now. Recognised for D.O.M.S. and F.R.C.S. Salary according to Whitley Council (MDB) rates.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRADFORD. ST. LUKE'S HOSPITAL.

HOUSE SURGEON (general and plastic), vacant now. Recognised for pre-registration purposes.

HOUSE OFFICER (anæsthetics), vacant now. Recognised for D.A. and F.F.A.R.C.S. Opportunities for plastic and intra-thoracic experience.

Salary for above posts according to Whitley Council (MDB) rates.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. HOUSE SURGEON (Thoracic Surgery Department). House Surgeon required in the above department, which is the regional Thoracic Surgery Centre (120 Beds) for the South West.

Applications with full particulars should be addressed to the Group Secretary, Frenchay Hospital, Bristol, quoting "Thoracic."

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. (513 staffed beds, expanding.) Applications are invited for the post of SENIOR HOUSE OFFICER in the regional Neurosurgery Department. This post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis.

Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (300 Beds.) CASUALTY HOUSE SURGEON (1 of 3) required. Duties include work in Orthopædic and Traumatic Unit. Pre-registration and recognised for F.R.C.S. Vacant mid-May.

Applications, stating age, qualifications and experience, with the names and addresses of 2 referees, to be sent to the Administrative Officer.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (300 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required immediately as Senior Casualty Officer. Salary £700–£50–£1000.

Applications, stating previous posts held, together with names of 2 referees, to the Administrative Officer.

BRIGHTON. SUSSEX EYE HOSPITAL. (56 Beds.) HOUSE SURGEON required at the above Hospital, vacant now. Recognised for D.O. Successful applicant will be considered for senior post (Senior House Officer) on completion of 6 months.

Applications stating age, qualifications and experience, and naming 2 referees, to the Administrative Officer.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE.

Bury General Hospital

SENIOR HOUSE OFFICER (anæsthetics), resident or non-resident. Recognised for D.A.

Applications, stating experience, qualifications, &c., with names of 2 referees, should be made to—

H. WILKINSON, Esq., Group Secretary.

Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL. CLINICAL PATHOLOGIST (Senior House Officer grade). Resident or non-resident, with duties mainly at Bury General Hospital. The post affords opportunities for gaining experience in all branches of pathology.

Apply, stating nationality, qualifications, &c., and names of 2 referees, to H. WILKINSON, Esq., Group Secretary.

Bury General Hospital, Bury, Lancs.

CAMBRIDGE. MATERNITY HOSPITAL. Resident OBSTETRICAL OFFICERS (2 appointments) (second or subsequent posts). 6 months from (*a*) early June, (*b*) 1st July. Recognised Pre-registration Service. Recognised for M.R.C.O.G. and D.Obst.R.C.O.G. examinations.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to Secretary, United Cambridge Hospitals, Addenbrooke's Hospital, by 15th May.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Surgi-CAL REGISTRAR, vacant 12th June, 1954, for 1 year in the first instance, renewable annually.

Apply, with full particulars and names of 3 referees, to Secretary, by 17th May.

CANTERBURY. KENT AND CANTERBURY HOS-PITAL. (276 Beds.) GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration, first, second, or third post). The above post, which is recognised for the F.R.C.S., is now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CHELMSFORD. ST. JOHN'S HOSPITAL. House SURGEON (pre-registration, first, second, or third post). Duties commencing 22nd May, 1954. The Hospital deals with a large number of routine and emergency cases. The post is recognised for the F.R.C.S.

Applications, stating age, nationality, qualifications, and experience, together with copies of recent testimonials, should be received not later than 10th May by R. G. MORRISH, Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford, Essex.

CHELMSFORD AND ESSEX HOSPITAL. (163 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post will become vacant on 20th May, and offers good surgical experience and is recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELTENHAM GENERAL HOSPITAL. (220 Beds.) Applications are invited for the appointment of HOUSE PHYSICIAN (House Officer grade). The post is resident and the salary and conditions of service are in accordance with the National Health Service regulations.

Applications, together with 2 testimonials, should be sent to STANLEY T. DAVIS, Secretary.

General Hospital, Cheltenham.

CHELTENHAM GENERAL EYE AND CHILDREN'S HOSPITAL. CHILDREN'S DEPARTMENT. Applications are invited for the post of RESIDENT MEDICAL OFFICER (House Officer grade) for the Children's Department (54 Beds). The appointment which is recognised for candidates entering for the D.C.H. offers scope for wide experience in all departments of pædiatrics, surgical cases and attendance at Outpatient Departments at the General Hospital. Previous hospital experience in pædiatrics is desirable. The appointment will be for a period of 6 months in the first instance.

Applications, together with copies of 3 testimonials, should be addressed to S. T. DAVIS, Group Secretary.

General Hospital, Cheltenham.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (430 Beds.) SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR. Post now vacant. F.R.C.S. essential. Hospital may be visited by arrangement with the Medical Superintendent (Tel. : Ottershaw 441).

Application forms can be obtained from, and should be returned by 22nd May, to, Secretary, Woking and Chertsey Hospital Management Committee, "Huntington," Chertsey, Surrey.

CHESTERFIELD HOSPITAL MANAGEMENT COM-MITTEE. Whole-time NON-RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER required for Whittington Hall, Chesterfield (372 female mentally deficient patients), and Scarsdale Hospital, Chesterfield. Present salary scale £700–£50–£1000 p.a., shortly to be increased in accordance with recent award.

Apply M. H. BOONE, Secretary, from whom further particulars may be obtained.

CHESTERFIELD ROYAL HOSPITAL. Chesterfield HOSPITAL MANAGEMENT COMMITTEE. RESIDENT CASUALTY OFFICER (pre-registration grade, or Senior House Officer if person appointed has sufficient experience), required at above Hospital immediately. National salary and conditions. The Casualty Department includes 2 Junior and 1 Senior Casualty Officers, and the post is recognised for F.R.C.S. training. Duties are primarily in the Casualty Department, but by mutual arrangement 1 Casualty Officer performs duties in the Accident and Orthopædic Department, so that opportunities occur for all 3 officers to gain experience in that specialty.

Apply in detail, with copies of recent testimonials, to—

M. H. BOONE, Secretary.

CHESTER (near). "THE MANOR" HOSPITAL, Great SUTTON, WIRRAL. Applications are invited for the appointment of Part-time MEDICAL OFFICER to the above Hospital (41 Beds for high-grade female M.D. patients). 2 hours weekly, £100 p.a.

Apply not later than 29th May, 1954, to the Secretary, Deva Hospital, Liverpool-road, Chester.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL. (202 acute beds.) RESIDENT HOUSE SURGEON required for 6 months appointment. National salary scale for first, second or third posts. Post approved for pre-registration practitioners. Post recognised for F.R.C.S. 6 residents, including Resident Surgical Officer and 3 House Surgeons. Vacant from 16th June, 1954.

Apply to the Senior Administrative Officer.

CARDIFF. ROYAL HAMADRYAD GENERAL AND SEAMEN'S HOSPITAL. CARDIFF HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER (surgical) required. Post covers 44 surgical beds under the care of Consultants from Cardiff Teaching Hospitals.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. ST. DAVID'S HOSPITAL. (656 Beds.) CARDIFF HOSPITAL MANAGEMENT COMMITTEE.

SENIOR HOUSE OFFICER (non-resident) required in Casualty Department to commence immediately.

Application form immediately from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

HOUSE OFFICER (resident) for Geriatric Unit (200 Beds).

Apply to Group Secretary at above address.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the following posts :—

Essex County Hospital, Colchester (189 Beds)

SENIOR HOUSE OFFICER (anæsthetics). Post tenable for 1 year. The successful candidate will be called upon to give anæsthetics in other hospitals in the Group.

HOUSE PHYSICIAN (first, second, or third post) ; tenable for 6 months.

HOUSE OFFICER (surgical). First, second, third, or pre-registration post ; tenable for 6 months.

Applications, with copies of 3 testimonials, should be forwarded to the Group Secretary, 14, Pope's-lane, Colchester.

COULSDON, SURREY. NETHERNE HOSPITAL. Applications are invited for the post of HOUSE OFFICER or SENIOR HOUSE OFFICER. All modern forms of treatment carried out in this Hospital of 2000 Beds which is recognised for the D.P.M. The Physician-Superintendent will give further information or arrange for the Hospital to be visited.

Apply for application forms from Secretary without delay.

CROYDON GROUP HOSPITAL MANAGEMENT COM-MITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Radiology (diagnostic). Whole-time non-resident for Group. Candidates should have a Diploma in Radiology. Hospitals in Group may be visited by appointment with Radiologist.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, Croydon, to be returned immediately.

CROYDON. MAYDAY HOSPITAL. (618 Beds.) Croydon GROUP HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer grade). Applications are invited for post which is now vacant. Recognised for Final F.R.C.S. examination. Particularly good for gaining experience in orthopædics and fracture work.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, Croydon.

CROYDON. MAYDAY HOSPITAL. (618 Beds.) House PHYSICIAN (pre-registration post) for period of 6 months in first instance from 7th June.

Application forms obtainable from GEORGE A. PAINES, Group Secretary, Hospital Management Committee, General Hospital, Croydon, to be returned immediately.

DEWSBURY. STAINCLIFFE GENERAL HOSPITAL. (314 Beds.) HOUSE OFFICER (general surgery), first, second, or third post, vacant now and tenable for 6 months. Recognised pre-registration appointment. The Hospital has a Surgical Unit of 66 Beds and is recognised for the F.R.C.S. Casualty duty is shared with 3 other House Officers.

Applications, with full particulars, to the Administrative Officer at the Hospital, quoting reference L.

DORKING GENERAL HOSPITAL, Horsham-road, DORKING, SURREY. (252 Beds.) REDHILL GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from candidates possessing some hospital experience for the post of RESIDENT HOUSE PHYSICIAN to the Department of Medicine, vacant 1st June, 1954. The medical firm consists of a visiting Consultant Physician, a full-time Physician and a resident House Physician. The post offers wide experience in general medicine and gives an excellent opportunity for candidates studying for M.R.C.P. Salary £450–£670 p.a., according to experience.

Apply to the Medical Superintendent.

DARLINGTON MEMORIAL HOSPITAL. (210 Beds.) DARLINGTON DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON (resident) which post is recognised for the F.R.C.S. (Eng.). Salary in accordance with national scale.

Apply, giving age and references, to the undersigned forthwith.
G.W. BECKWITH, Group Secretary.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) SENIOR HOUSE OFFICER (pædiatrics), vacant May.

Apply, giving 2 names for reference, to the Secretary, Derby No. 1 Hospital Management Committee, Babington-lane, Derby.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER, vacant June.

Applications, with 2 names for reference, should be sent to the Secretary, No. 1 Hospital Management Committee, Babington-lane, Derby.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. (86 Beds.) HOUSE PHYSICIAN (pre-registration) or SENIOR HOUSE OFFICER, vacant end of June.

Applications, with 2 names for reference, should be sent to the Secretary, No. 1 Hospital Management Committee, Babington-lane, Derby.

DERBY. DERBYSHIRE ROYAL INFIRMARY. House SURGEON (pre-registration) or SENIOR HOUSE OFFICER (general surgery), vacant 1st July, 1954.

Applications, with copies of 2 recent testimonials, to be sent to Secretary at the Infirmary.

DERBY. DERWENT HOSPITAL. (187 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (chest and infectious diseases) required. A Consultant Thoracic Surgeon attends this Hospital each week. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 17th May, 1954, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DOVERCOURT. HARWICH AND DISTRICT HOS-PITAL. (30 Beds.) Applications invited for post of SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

Applications, with copies of 3 testimonials, should be forwarded to the Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP. BIRMINGHAM REGION. Applications invited from registered practitioners for following appointments :—

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (resident), casualty. Post now vacant. Salary £670 p.a., less £150 p.a. in respect of residential emoluments.

Corbett Hospital, Stourbridge (106 Beds)

SENIOR HOUSE OFFICER (resident), casualty. Post now vacant. Salary £670 p.a., less £150 p.a. in respect of residential emoluments.

Wordsley Hospital, near Stourbridge (478 Beds)

SENIOR HOUSE OFFICER (resident), Anæsthetist. Post now vacant. Salary £670 p.a., less £150 p.a. in respect of residential emoluments. In addition to general surgery, experience is available in gynæcology and there is a major Orthopædic Unit. Regional Plastic Surgery Unit at this Hospital.

Prestwood Sanatorium (200 Beds)

SENIOR HOUSE OFFICER (resident). Post now vacant. Salary £670 p.a., less £150 p.a. for residential emoluments.

Applications, stating age, experience, with copies of 3 recent testimonials, to Group Secretary, The Guest Hospital, Dudley, Worcs.

DURHAM. COUNTY HOSPITAL. (120 Beds.) Senior HOUSE OFFICER (orthopædic and casualty) required immediately. Hospital is main Accident and Orthopædic Hospital for the area.

Applications, with full particulars and names of 2 referees, to Group Secretary, Durham Hospital Management Committee, Dryburn Hospital, Durham.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. RESIDENT GYNÆCOLOGICAL HOUSE SURGEON for above Hospital, vacant 17th June, 1954. Post recognised for M.R.C.O.G. purposes. Salary £400–£450 p.a., according to experience. Deduction of £100 p.a. for board, lodging, &c. 6 months appointment.

Applications, stating age, qualifications, experience, and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 15th May, 1954. Candidates selected for interview will be notified by 22nd May, 1954.

EAST CUMBERLAND HOSPITAL MANAGEMENT COMMITTEE. Appointment of House Officers. Applications are invited for the following appointments :—

Cumberland Infirmary, Carlisle (340 Beds)

1 HOUSE OFFICER (" Specials "—E.N.T. and Eyes).

1 SENIOR HOUSE OFFICER (orthopædics).

Applications, with names of 2 referees, should be forwarded immediately to the Secretary, East Cumberland Hospital Management Committee, Cumberland Infirmary, Carlisle.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. UNITED CAMBRIDGE HOSPITALS. REGISTRAR in Psychiatry at Fulbourn Mental Hospital and Addenbrooke's Hospital, Cambridge. This is a trainee post which provides full facilities for clinical work with all types of patients and study for D.P.M. The successful candidate will work initially at Fulbourn Hospital and later also undertake duties at Addenbrooke's Hospital. Appointment for 1 year, renewable for second year.

Detailed applications, including age, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 17th May, 1954. Candidates invited to visit hospitals by direct arrangement with Medical Superintendent, Fulbourn Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. (1) 2 ANÆSTHETIC REGISTRARS required. 1 at East Suffolk and Ipswich Hospital (recognised for D.A.), 1 at Newmarket General Hospital, vacant now.

(2) PÆDIATRIC REGISTRAR in the Peterborough Area. Main hospital Peterborough Memorial. Duties also at Stamford and Rutland Hospital and North Cambs. Hospital, Wisbech. Post provides wide experience.

Appointments for 1 year, renewable for second year.

Detailed applications, including age, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 17th May, 1954. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretaries at (1) hospitals concerned, and (2) Memorial Hospital, Peterborough.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 16th May. Pre-registration post but registered practitioners may apply. Recognised for F.R.C.S.

Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, should be sent immediately to Group Secretary at above address.

FARNBOROUGH HOSPITAL, Farnborough, Kent. SENIOR HOUSE OFFICER in E.N.T Department required immediately for 1 year. Deduction for residence £150. Recognised for D.L.O.

Apply, stating age, qualifications with dates, previous experience, and naming 3 referees, to the Administrative Officer.

FOLKESTONE. ROYAL VICTORIA HOSPITAL. Applications are invited for the appointment of HOUSE SURGEON at the above Hospital which is recognised for Pre-registration Service. Salary £350, £400, or £450 a year according to experience, less a deduction of £100 a year for residential emoluments. This post is recognised by the Royal College of Surgeons for the F.R.C.S. examination.

Applications, stating age, qualifications, experience, and the names and addresses of 2 referees, to the Group Secretary, " Ash-Eton," Radnor Park West, Folkestone.

GLASGOW, S.W.1. DAVID ELDER INFIRMARY. (50 gynæcological beds.) JUNIOR HOUSE OFFICER required for 1st August, 1954, for above Gynæcological Unit. Post recognised by University as pre-registration appointment.

Apply, in writing, immediately to Medical Superintendent.

GRIMSBY GENERAL HOSPITAL. (226 Beds. Recog-nised for Training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT SURGICAL REGISTRAR required from 1st July, 1954. Married accommodation may be available. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 17th May, 1954, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

GRIMSBY GENERAL HOSPITAL. (226 Beds.) Grimsby HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER for Orthopædic, Fracture and Accident Service. Previous surgical and orthopædic experience would be an advantage. Post recognised for F.R.C.S. Excellent Medical Library facilities. Locum would be considered.

Applications should be sent immediately to the Hospital Secretary, Grimsby General Hospital.

GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (232 Beds.) RESIDENT SENIOR HOUSE OFFICER for Anæsthetics required. Post recognised by Faculty of Anæsthetists and experience in gynæcological and maternity work will be arranged at St. Luke's Hospital. Operations in main theatres totalled 4367 in 1953 and there is a large Casualty Department.

Apply, with full details of experience and copies of 3 testimonials, to Hospital Secretary.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. (170 Beds. 5 residents.) RESIDENT CASUALTY OFFICER (Junior Hospital Medical Officer) required. Post now vacant.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) CASUALTY OFFICER (Male or Female), third post held, with attachment to Pædiatrician and Ophthalmic Consultant. Salary £450 p.a., less £100 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 21st June, 1954.

Apply, with full details and references, to Secretary, Hertford County Hospital, Hertford, Herts.

HASTINGS AND ST. LEONARDS. BUCHANAN HOS-PITAL. (94 Beds.) HOUSE SURGEON for Gynæcology (28 gynæcological beds). Post, vacant 2nd June for 6 months, is recognised for M.R.C.O.G. Candidates for Pre-registration Service (surgery) can be considered.

Apply, with 3 recent testimonials, to the Hospital Administrator.

HASTINGS AND ST. LEONARDS. BUCHANAN HOS-PITAL. (94 Beds.) SENIOR HOUSE OFFICER required for Urology and Children's Surgery. Post, vacant 20th May, is recognised for F.R.C.S. and may be tenable for 6 or 12 months. National scale of salary.

Apply to Hospital Administrator.

HASTINGS GROUP HOSPITAL MANAGEMENT COM-MITTEE. Locum ORTHOPÆDIC REGISTRAR required immediately. Week-to-week basis. Salary £16 per week.

Apply Group Secretary, 11, Holmesdale-gardens, Hastings (Phone : Hastings 5400).

HASTINGS. ST. HELEN'S HOSPITAL. (497 Beds.) HOUSE PHYSICIAN (resident) for Pædiatrics and General Medicine. National scale of salary. Post vacant 17th May.

Apply to Hospital Administrator.

HALIFAX AREA HOSPITALS MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics required for duty at Halifax General Hospital (425 Beds) and Royal Halifax Infirmary (301 Beds). Residence at Halifax General Hospital. Post now vacant.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) HOUSE SURGEON (E.N.T. and ophthalmology) required. Post now vacant. Approved pre-registration appointment.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (705 Beds.) HOUSE SURGEON (general and traumatic) required. Pre-registration House Officers may also apply.

Applications, together with copies of not more than 3 recent testimonials, to Medical Director by 18th May.

HOVE GENERAL HOSPITAL. House Physician (pre-registration), vacant mid-June. Post is suitable for candidates working for higher degree. £350–£400, less £100 p.a. for residential emoluments.

Applications, stating age, qualifications, full details of experience, together with names and addresses of 2 referees, to the Administrative Officer, within 7 days of the appearance of this advertisement.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. 2 HOUSE SURGEONS required, to commence duty immediately. The posts are recognised as pre-registration appointments. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of JUNIOR HOUSE OFFICER (medical) at this Hospital which is approved by the licensing authority for Pre-registration Service. The selected candidate will be required to look after medical and pædiatric cases and may be called upon to give emergency anæsthetics.

Apply, with full particulars and names of 2 referees, to Group Secretary, Hospital Management Committee, Newmarket General Hospital, Newmarket.

INVERNESS HOSPITALS BOARD OF MANAGEMENT. ROYAL NORTHERN INFIRMARY. HOUSE SURGEON (general surgery) required immediately. Post recognised for pre-registration and F.R.C.S.

Applications, with references, to Medical Superintendent.

INVERNESS HOSPITALS BOARD OF MANAGEMENT. ROYAL NORTHERN INFIRMARY. HOUSE SURGEON (E.N.T. and eyes), required immediately. Post recognised for pre-registration.

Applications, with references, to Medical Superintendent.

IPSWICH BOROUGH GENERAL HOSPITAL, Heath-road, IPSWICH. (273 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in the Orthopædic and Fracture Department (32 Beds), vacant 8th May.

Applications, with copies of 2 recent testimonials, to Hospital Secretary.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. (360 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

KEIGHLEY AND DISTRICT VICTORIA HOSPITAL, KEIGHLEY, YORKSHIRE. (143 Beds.) RESIDENT HOUSE SURGEON (either sex) (general surgery, orthopædics, and E.N.T.). First, second, or third post. Vacant now. The post is recognised under the F.R.C.S. regulations and is an approved pre-registration appointment. Tenable for 6 months. Practitioners registered before 1st January, 1953, may apply.

Applications, with full particulars as to age, nationality, qualifications, &c., and copies of testimonials, to be sent to Group Secretary, St. John's Hospital, Fell-lane, Keighley.

LANCASTER. ROYAL LANCASTER INFIRMARY. LANCASTER AND KENDAL HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of RESIDENT REGISTRAR (obstetrics and gynæcology) at the above Infirmary. The unit is Consultant staffed and comprises 40 obstetric and 22 gynæcological beds. The post will be vacant June, 1954.

Applications, stating age, qualifications and details of present and previous experience, together with names of 3 referees, to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) SENIOR HOUSE OFFICER (casualty). The successful applicant will work with the Specialist Orthopædic Unit. Post recognised for F.R.C.S., is vacant May, 1954, and normally tenable for 1 year.

Applications, with names of 2 referees, to be addressed to the Secretary, Royal Lancaster Infirmary, Lancaster.

LEEDS, 2. PUBLIC DISPENSARY AND HOSPITAL. LEEDS A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER (Senior House Officer) at the above Dispensary. The appointment will be for a period of 1 year. Salary in accordance with the agreed terms and conditions of service of hospital medical and dental staffs, with an appropriate deduction in respect of board, lodging, &c.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the following REGISTRAR posts :—

Anæsthetics

(*a*) Hull A Group with additional duties at hospitals in the Hull B and East Riding Groups (non-resident). Recognised for the F.F.A.R.C.S.

(*b*) St. James's Hospital, Leeds, with additional duties at hospitals in the Leeds A and B Groups (non-resident). Recognised for the D.A. and recognition is being sought for the F.F.A.R.C.S.

(*c*) Hull A Group (non-resident). Recognised for the F.F.A.R.C.S.

General Surgery

(*a*) Clayton Hospital, Wakefield (75 general surgical beds). Duties are those of Resident Surgical Officer. Recognised for F.R.C.S.

(*b*) St. Luke's Hospital, Bradford (170 general surgical beds) (non-resident). Recognised for the F.R.C.S.

(*c*) Hull A Group, mainly at Western and Kingston General Hospitals (150 general surgical beds) (resident or non-resident). Recognised for the F.R.C.S.

(*d*) Leeds A Group (140 general surgical beds). Resident at St. James's Hospital. Duties are those of Resident Surgical Officer. Recognised for the F.R.C.S.

Infectious Diseases

Leeds Road Hospital, Bradford (120 I.D. beds) (resident).

Orthopædic Surgery

(*a*) Woodlands Orthopædic Hospital, Rawdon (100 Beds), and Orthopædic Outpatient Department, Bradford Royal Infirmary. Offers excellent training in all branches of accident and orthopædic surgery. May be non-resident.

(*b*) Royal Bath Hospital, Harrogate, duties in connection with the Regional Rheumatism Scheme (resident).

(*c*) Halifax Royal Infirmary (approximately 60 orthopædic beds) and at other hospitals in the Halifax Group (preferably resident).

Psychiatry

(*a*) Oulton Hall Hospital, near Wakefield, and affiliated Mental Deficiency Colonies (aggregating 780 Beds) (non-resident).

(*b*) Storthes Hall Hospital, Kirkburton, near Huddersfield (2680 Beds), and associated clinics. Accommodation available for a single person.

Facilities for attendance at the Leeds University will be provided if the successful candidates are studying for the D.P.M.

Applications, stating age, qualifications and details of appointments held showing dates, with names and addresses of 3 referees, to the Secretary, Joint Registrars' Committee, Park-parade, Harrogate, not later than Friday, 21st May, 1954.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of REGISTRAR in the Department of Diagnostic Radiology of Teaching Hospital. The appointment is non-resident and will be for a period of 1 year in the first instance. The post offers excellent opportunity for training in this specialty.

Applications, stating age, qualifications, and previous posts with dates, together with the names of 3 referees, are to be forwarded not later than 31st May, 1954, to the Sub-Dean, School of Medicine, Leeds, 2.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER to the Department of Pædiatrics and Child Health for duties at the Maternity Hospital, Hyde Terrace, Leeds, 2. The appointment will be resident and will be for a period of 1 year.

Applications, stating age, qualifications, and previous posts with dates, together with the names of 3 referees, are to be forwarded to the undersigned not later than 19th May, 1954.

J. ARNOLD TUNSTALL, Secretary to the Board.

General Infirmary, Leeds, 1.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of HOUSE OFFICER to the Department of General Surgery at the General Infirmary at Leeds. The post, which is resident and will be for a period of 6 months, is a pre-registration appointment under the terms of the Medical Act, 1950.

Applications, stating age, qualifications, and the names of 3 referees, are to be forwarded to the undersigned as soon as possible. J. ARNOLD TUNSTALL, Secretary to the Board.

General Infirmary, Leeds, 1.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of ASSISTANT RESIDENT MEDICAL OFFICER at the General Infirmary at Leeds. The post is in the Registrar grade and will be for 1 year in the first instance.

Applications, stating age, qualifications, and previous posts with dates, are to be forwarded not later than 22nd May, 1954, to the Sub-Dean, School of Medicine, Leeds, 2.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in the Radiotherapy Centre of the General Infirmary at Leeds. The post is resident and will be for a period of 1 year. The post affords excellent opportunity for training in this specialty.

Applications, stating age, qualifications and previous experience, with the names of 3 referees, should be forwarded to the undersigned not later than 29th May, 1954.

J. ARNOLD TUNSTALL, Secretary to the Board.

The General Infirmary, Leeds, 1.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of SENIOR REGISTRAR to the Department of Diagnostic Radiology of Teaching Hospital Group. The post is non-resident and will be for 1 year in the first instance. Preference will be given to candidates with a higher qualification.

Applications, stating age, qualifications, previous experience, together with the names of 3 referees, are to be forwarded to the Sub-Dean, School of Medicine, Leeds, 2, not later than 22nd May, 1954.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of REGISTRAR in the Department of Orthopædics at the General Infirmary at Leeds. The appointment, which will become vacant on 1st July, 1954, will be non-resident and will be for 1 year in the first instance.

Applications, stating age, qualifications, and previous posts with dates, together with the names of 3 referees, are to be forwarded to the Sub-Dean, School of Medicine, Leeds, 2, not later than 22nd May, 1954.

LEEDS. THE UNITED LEEDS HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER to the Department of Urology at the General Infirmary at Leeds. The post, which is resident, will be for a period of 6 months in the first instance.

Applications, stating age, qualifications and previous posts with dates, should be forwarded to the undersigned not later than 29th May, 1954.

J. ARNOLD TUNSTALL, Secretary to the Board.

The General Infirmary, Leeds, 1.

LEEDS. THE UNITED LEEDS HOSPITALS. Applications are invited for the post of RESIDENT ORTHOPÆDIC OFFICER at the General Infirmary at Leeds. The post is of Senior House Officer status and will be for an initial period of 6 months, renewable for a further 6 months thereafter.

Applications, stating age, qualifications, and previous posts with dates, together with the names of 3 referees, are to be forwarded to the undersigned not later than 29th May, 1954.

J. ARNOLD TUNSTALL, Secretary to the Board.

The General Infirmary, Leeds, 1.

LEEDS A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (anæsthetics) for duties mainly at St. James's Hospital. The appointment, which is recognised for the Diploma in Anæsthetics, will be for a period of 1 year, and the salary will be in accordance with the agreed terms and conditions of service of hospital medical and dental staffs—namely, £670 p.a., with an appropriate deduction in respect of board, lodging, and other services provided.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

LEEDS (near). WOODLANDS (ORTHOPÆDIC) HOSPITAL, RAWDON, near LEEDS. (92 Beds.) SENIOR HOUSE SURGEON required for Orthopædic Hospital at Rawdon. The post will be adjoined to the Casualty and Orthopædic Unit at the Royal Infirmary, Bradford, and offers excellent opportunities for a person interested in orthopædic work. Salary according to Whitley Council (MDB) rates.

Applications, stating age, nationality, qualifications and experience, with copy testimonials to Secretary, Bradford Royal Infirmary.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP. Applications are invited for HOUSE SURGEON (E.N.T. and ophthalmology).

Applications as soon as possible to Hospital Secretary.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP. Applications are invited for HOUSE OFFICER (anæsthetics). The post is recognised for D.A.

Applications as soon as possible to the Hospital Secretary.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP. Applications invited for post of CASUALTY OFFICER (Senior House Officer), Male or Female, resident or non-resident. Post vacant and suitable for one reading for higher qualification, affording contact with all Specialist Units in Hospital.

Applications, with names and addresses of 3 referees, to Hospital Secretary.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Applications are invited for the post of HOUSE SURGEON for General Surgery. The post is recognised for F.R.C.S. and for Pre-registration Service.

Apply, giving full particulars, to—

R. W. HOWICK, Group Secretary.

LINCOLN. LAWN HOSPITAL, Union-road, Lincoln. (Mental Hospital for private patients—100 Beds.) LINCOLN NO. 2 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required. Salary and conditions of service in accordance with latest recommendations of Whitley Council. A flatlet is available.

Apply as early as possible to Medical Superintendent.

LIVERPOOL. AINTREE HOSPITAL (late Fazakerley Sanatorium). LIVERPOOL AND DISTRICT FAZAKERLEY GROUP OF HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for appointment of RESIDENT SENIOR HOUSE OFFICER in Anæsthesia. The Hospital is for the treatment of pulmonary and non-pulmonary tuberculosis, and is a main centre for thoracic surgery and has an Orthopædic Department. Salary will be in accordance with terms and conditions of service for hospital medical staff.

Applications, endorsed Resident Senior House Officer, to be submitted immediately to the Physician-Superintendent, Aintree Hospital, Fazakerley, Liverpool, 9.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of SENIOR HOUSE OFFICER in Ophthalmology at the St. Paul's Eye Hospital for the period to 30th September, 1954. The successful candidate will be eligible to apply for reappointment for a further period from 1st October, 1954.

Apply by 22nd May, 1954, on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for a post of SENIOR REGISTRAR in Dermatology for the period 1st October, 1954–30th September, 1955. Annual reappointment thereafter until completion of the normal period of training will be considered without need for further application. The successful candidate will be able to take up duties before 1st October if he is available to do so.

Apply by 22nd May, 1954, on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL RADIUM INSTITUTE, Liverpool, 7. Applications are invited for a resident post in the JUNIOR HOSPITAL MEDICAL OFFICER grade. Salary scale £700–£50–£1000 according to experience. This appointment is particularly valuable to practitioners who contemplate adopting radiotherapy as a special career. On the other hand, it provides an excellent opportunity for studying for a higher qualification either in medicine or in surgery.

Applications, giving particulars of age and experience, together with names and addresses of 2 referees, should reach the Medical Director by 19th May, 1954.

LIVERPOOL. WALTON HOSPITAL. The following resident posts, which are recognised for Pre-registration Service, are vacant :—

HOUSE PHYSICIAN.

HOUSE SURGEON in Orthopædics.

Applications, stating age, date of qualification, experience, and copies of 2 recent testimonials, to the Physician-Superintendent, Walton Hospital, Liverpool, 9.

LICHFIELD (near). ST. MATTHEW'S HOSPITAL, BURNTWOOD, near LICHFIELD, STAFFS. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry) at the above Hospital (1300 mental beds). Resident accommodation available.

Applications, with full details and copies of recent testimonials, to Medical Superintendent.

LLANELLY HOSPITAL. (166 Beds.) Glantawe Hospital MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the 2 posts of JUNIOR HOSPITAL MEDICAL OFFICERS (resident) for work in the Surgical Unit of 75 Beds. The posts offer excellent experience in general surgery.

Applications, stating age, experience and qualifications, to be addressed to the Hospital Secretary, Llanelly Hospital, Marble Hall-road, Llanelly.

LLANELLY HOSPITAL, Llanelly, Carmarthenshire. GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER in the E.N.T. Department of the above Hospital. Salary £700–£50–£1000.

Applications, with full details of experience, qualifications and age, together with the names of 2 referees, should be sent to the Hospital Secretary, Llanelly Hospital, Llanelly, Carms.

MAIDSTONE. MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the Kent County Ophthalmic and Aural Hospital, and the West Kent General Hospital, Maidstone (total beds 248). The post, which is vacant now, is of Senior House Officer grade, and carries a salary of £670 a year, less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A.R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available and the post is recognised for the purposes of the F.R.C.S. and the D.L.O. Salary will be £670 a year, less £150 a year for residential emoluments.

Applications immediately to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (135 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RECEIVING-ROOM OFFICER. Post vacant immediately. Salary £670 a year, with deduction of £150 a year for residential emoluments.

Applications to Administrative Officer at Hospital as soon as possible.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. 2 SENIOR SURGICAL HOUSE OFFICERS, to commence on 25th August and 1st September, 1954. Whole-time non-resident surgical training posts. Duties are allotted in the Orthopædic Department, Surgical Outpatient Department and General Surgical Units in rotation. Appointment for 6 months, renewable for a second 6 months, at a salary of £670 p.a.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 29th May, 1954.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. RESIDENT CASUALTY OFFICER, to commence on 15th September, 1954. Whole-time resident post. Applicants must have held house appointments and have had surgical experience. Appointment for 6 months, renewable for a second 6 months, at a salary of £670 p.a., less £130 p.a. for residence.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 29th May, 1954.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. REGISTRAR in the University Department of Orthopædic Surgery, to commence on 22nd September, 1954. Appointment for 12 months, renewable. Applicants must possess a higher qualification.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 29th May, 1954.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR REGISTRAR to Medical Professorial Unit, to commence on 1st September, 1954. Whole-time non-resident post, tenable for 12 months, renewable. Applicants must possess a higher qualification. Arrangements may eventually be made for the successful candidate to transfer to one of the Manchester Regional Hospitals to continue training.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 15th May, 1954.

F. J. CABLE, Secretary to the Board of Governors.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. REGISTRAR to the Department of Anæsthetics, to commence on 15th August, 1954. Whole-time, non-resident post, tenable for 12 months, renewable. Applicants should preferably possess a higher qualification.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 15th May, 1954.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR ANÆSTHETICS HOUSE OFFICER, to commence 1st August, 1954. This appointment is for 6 months, renewable for a second and possibly a third 6 months at a salary of £670 p.a., with a deduction at the rate of £130 p.a. for residence. Applicants should have had experience in the specialty.

Applications to be made on forms obtainable from the undersigned and to be returned not later than 15th May, 1954.

G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. UNIVERSITY DEPARTMENT OF OPHTHALMOLOGY. Applications are invited for the following posts at the above Hospital (attached to the University Department of Ophthalmology) :—

2 SENIOR REGISTRARS.
1 REGISTRAR.

Whole-time posts (non-resident). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staffs will apply.

Applications to be made on forms obtainable from the undersigned.

F. J. CABLE, Secretary to the Board of Governors.

MANCHESTER REGIONAL HOSPITAL BOARD AND THE BOARD OF GOVERNORS OF THE UNITED MANCHESTER HOSPITALS invite applications for the post of SENIOR REGISTRAR in Diagnostic Radiology. The person appointed will be required to undertake duties at Christie Hospital and Holt Radium Institute, Manchester, and at the United Manchester Hospitals (Manchester Royal Infirmary, &c.). D.M.R.D. essential.

Forms of application may be obtained from the Senior Administrative Medical Officer of the Board, Cheetwood-road, Manchester, 8, and should be returned by 17th May, 1954.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of RESIDENT REGISTRAR in General Surgery in the Blackburn and District Hospital Group with duties mainly at Queen's Park Hospital, Blackburn. Recognised post for F.R.C.S.

Application forms may be obtained from the Secretary of the Committee, Royal Infirmary, Blackburn.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR (resident or non-resident) in E.N.T. Surgery to the Wigan and Leigh Group of hospitals with main duties at the Royal Albert Edward Infirmary, Wigan. The post which is recognised for D.L.O. will be vacant 10th May, 1954.

Applications should be made to the Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan, together with the names of 2 referees.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for the post of RESIDENT REGISTRAR in General Medicine to the Wigan and Leigh Group of hospitals with main duties at the Royal Albert Edward Infirmary, Wigan.

Applications should be made to the Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan, giving the names of 2 referees.

MANCHESTER REGIONAL HOSPITAL BOARD. BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a post of Locum REGISTRAR or SENIOR HOUSE OFFICER (according to experience) in the Obstetric and Gynæcological Department based at the Risedale Maternity Hospital, for June and July.

Applications to Group Secretary, 52, Paradise-street, Barrow-in-Furness.

MORECAMBE. QUEEN VICTORIA HOSPITAL. (100 Beds.) RESIDENT SENIOR HOUSE OFFICER (casualty) required immediately for the normal period of 1 year or for a temporary period as a locum. Successful applicant will be attached to the Specialist Orthopædic Unit.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

NEWBURY DISTRICT HOSPITAL. (90 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (resident), General Surgery, for above Hospital.

Applications, with 3 names for reference, to Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

NEWCASTLE REGIONAL HOSPITAL BOARD.

Tees-side Hospital Management Committee

REGISTRAR PATHOLOGIST (whole-time) required for Area Group Laboratory. Appointment offers unique opportunity to obtain training in all branches of clinical pathology.

Newcastle upon Tyne Hospital Management Committee

REGISTRAR CHEST PHYSICIAN (whole-time) required at Walker Gate Hospital with duties in a Chest Clinic. A furnished house is available in the Hospital grounds at a nominal rental.

REGISTRAR in Pathology (whole-time), non-resident, required for Newcastle General Hospital.

Appointments for 1 year in the first instance and may be renewed for a further year. Salary in accordance with national terms and conditions of service.

Applications, together with names and addresses of referees (preferably) or testimonials, to a total of 3, to be addressed to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER or SENIOR HOUSE SURGEON (orthopædics). Joint appointment now vacant at Newcastle General Hospital (861 Beds) and the W. J. Sanderson Orthopædic Hospital School for Children (121 Beds). Duties mainly at the latter hospital where resident accommodation is available.

Applications, with copies of 2 recent testimonials, should be sent to the Group Secretary, Newcastle upon Tyne Hospital Management Committee, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4.

NEWMARKET GENERAL HOSPITAL, Newmarket, SUFFOLK. RESIDENT SENIOR HOUSE OFFICER for traumatic, orthopædic and casualty work required immediately for a period of 3 months, probably extendible to 6. House charge of 54 orthopædic beds under the Consultant. Salary in accordance with national scale.

Applications, with copies of 3 recent testimonials, to the Physician-Superintendent.

NEWMARKET GENERAL HOSPITAL, Newmarket, SUFFOLK. Applications are invited for the post of HOUSE SURGEON, which is immediately vacant. Duties include surgical house charge of general surgical, E.N.T., and eye cases. The post is resident and available for 6 months and is recognised for pre-registration.

Applications, with copies of 3 recent testimonials, should be addressed to the Physician-Superintendent.

NEWPORT, MONMOUTHSHIRE. ROYAL GWENT HOSPITAL. (260 Beds.) SENIOR HOUSE OFFICER in General Surgery (non-resident) required. The post is based here, but covers work at another hospital also. House Surgeons are engaged at both and the post is of a senior character providing good experience. Salary £670.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

NEWPORT, MONMOUTHSHIRE. ROYAL GWENT HOSPITAL. (260 Beds. 10 residents. Recognised F.R.C.S.) SENIOR HOUSE OFFICER required for Casualty Department in June. This is the base Hospital in the Group and all medical and surgical emergencies are admitted through casualty, which is under the full-time charge of a Senior Hospital Medical Officer there being also 2 Senior House Officers. Post recognised for F.R.C.S. for 6 months and tenable 6 or 12 months as desired. Salary £670, less £120 for board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

NORTHALLERTON. FRIARAGE HOSPITAL. (General —337 Beds.) NORTHALLERTON HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (Surgeon) (pre-registration post) required at the above Hospital. National salary and conditions.

Applications to be made to the Group Secretary, Friarage Hospital, Northallerton, Yorkshire.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. RESIDENT SENIOR HOUSE OFFICER required in Department of Pathology.

Applications, stating age, qualifications and experience, with the names of 3 referees, to be sent to the Resident Medical Officer, by 12th May 1954.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON for General Surgery, Urology and Ophthalmology, vacant early June. Recognised for the Final F.R.C.S. in General Surgery, and recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, by 26th May, 1954.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN for General Medicine and Neurology, vacant early June. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, by 26th May, 1954.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN to the Radiotherapy Department, vacant early June. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, by 26th May, 1954.

NOTTINGHAM GENERAL HOSPITAL. (441 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT CASUALTY REGISTRAR required. This busy department provides excellent experience. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 17th May, 1954, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM GENERAL HOSPITAL. Resident HOUSE SURGEONS required (Male or Female ; also open to pre-registration candidates) at the above Hospital ; duties to commence in June next. Salary and conditions of service in accordance with published regulations. The appointments are for a term of 6 months.

Applications, stating age, qualifications and experience, to be sent to HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR ORTHOPÆDIC AND FRACTURE HOUSE OFFICER. (Locum Tenens considered.) The post offers exceptional experience in traumatic and orthopædic surgery. Duties to commence as soon as possible. Salary and conditions of service in accordance with Ministry regulations. If resident £150 deducted for emoluments.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—
HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners (Male or Female) for the post of RESIDENT SENIOR ANÆSTHETIC HOUSE OFFICER ; duties to commence at the beginning of June, 1954. Terms and conditions of service in accordance with the published regulations of the Ministry of Health. £150 deducted for residential emoluments.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the undersigned as soon as possible.
HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered general practitioners for the post of THIRD CASUALTY OFFICER (Senior House Officer grade). Salary (less £150 emoluments) and conditions of service in accordance with those laid down by the Ministry. Duties to commence as soon as possible. This post offers wide experience of casualty work. The Staff establishment requires only 1 night in 3 emergency work, and off duty permits time for study for higher examinations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—
General Hospital, Nottingham. HENRY M. STANLEY.

NOTTINGHAM GENERAL HOSPITAL. Required, SENIOR MEDICAL HOUSE OFFICER for the above Hospital ; duties to commence as soon as possible. Salary (less £150 p.a. residential emoluments) and conditions of service in accordance with those laid down by the Ministry.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—
General Hospital, Nottingham. HENRY M. STANLEY.

NOTTINGHAM GENERAL HOSPITAL. Resident HOUSE SURGEON required (Male or Female, also open to pre-registration candidates) at the above Hospital ; duties to commence as soon as possible. Salary and conditions of service in accordance with published regulations. The appointment is for a term of 6 months.

Applications, stating age, qualifications, and experience, to be sent to HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Resident HOUSE PHYSICIANS required (Male or Female ; also open to pre-registration candidates) at the above Hospital ; duties to commence in June next. Salary and conditions of service in accordance with published regulations. The appointments are for a term of 6 months.

Applications, stating age, qualifications and experience, to be sent to HENRY M. STANLEY, Group Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL. Applications are invited from fully qualified medical practitioners for the post of SENIOR HOUSE OFFICER in the Obstetrical and Gynæcological Department (41 obstetrical beds, 11 gynæcological beds and a small block for puerperal pyrexia). The appointment is for a period of 12 months commencing about mid-May. The Hospital is recognised for the M.R.C.O.G. (obstetrics only). Previous obstetric experience required. Salary and conditions of service in accordance with the Ministry regulations.

Applications, stating age, qualifications and experience, also nationality, with copies of 3 recent testimonials, to be sent to—
General Hospital, Nottingham. HENRY M. STANLEY.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical), which is vacant immediately. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON (post recognised for pre-registration), which is vacant immediately. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (804 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (surgical) (3 vacancies), vacant 1st June. The post is approved for F.R.C.S. The officers appointed will be required to spend 6 months in general surgery, 3 months thoracic surgery, and 3 months orthopædic and plastic surgery. A deduction of £150 p.a. will be made for residential emoluments.

Applications, stating age, nationality, qualifications, and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for post of EMERGENCY OFFICER (for general duties in all departments). Post can be paid at the rate of £670 p.a. if candidate has suitable qualifications.

Apply, stating age, qualifications and experience, together with names of 2 referees, to Administrator, Radcliffe Infirmary, Oxford.

PERTH. COUNTY AND CITY OF PERTH GENERAL HOSPITALS. The following House Officer posts will fall vacant on 1st August, 1954 :—

Bridge of Earn Hospital

*3 SENIOR HOUSE SURGEONS (Fracture and Orthopædic Unit).
*3 HOUSE SURGEONS (Fracture and Orthopædic Unit).
*3 HOUSE SURGEONS (general surgical wards).
1 HOUSE SURGEON (E.N.T. ward).
†1 HOUSE SURGEON (gynæcology and obstetrics).
4 HOUSE PHYSICIANS (medical wards).

Perth Royal Infirmary

*2 HOUSE SURGEONS (general surgical wards).
*1 HOUSE SURGEON (casualty and E.N.T.).
3 HOUSE PHYSICIANS (medical wards).
‡1 SENIOR HOUSE OFFICER (anæsthetics).

Notes :

(1) Senior House Officer posts are tenable for 12 months and Junior House Officer posts for 6 months, with the exception of the House Officer (gynæcology and obstetrics) : this post is tenable for 12 months and consists of 6 months gynæcology at Bridge of Earn Hospital, followed by 6 months obstetrics at Perth Royal Infirmary.

(2) All Junior House Officer posts are recognised for Pre-registration Hospital Service.

(3) Posts marked * are recognised by the Royal College of Surgeons under the regulations for the F.R.C.S.

(4) Post marked † is recognised both for Gynæcology and Obstetrics by the Royal College of Obstetricians and Gynæcologists under the regulations for the M.R.C.O.G.

(5) Post marked ‡ is recognised under the regulations for the D.A.

Applications, giving details of age, qualifications, experience, and the names of 2 referees, should be sent to the Group Medical Superintendent, Perth Royal Infirmary, Perth.

PERTH ROYAL INFIRMARY. Applications are invited for the post of CASUALTY OFFICER (House Officer or Senior House Officer grade according to experience), vacancy till end of July.

Applications, with details of experience and names of 2 referees, should be sent immediately to the Medical Superintendent.

PLYMOUTH AND DEVONPORT. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

SENIOR HOUSE OFFICER in Anæsthetics, vacant 20th July, 1954.
HOUSE SURGEONS, required immediately, also 1st and 15th July, 1954.
DENTAL HOUSE SURGEON, vacant 16th July, 1954, recognised for the Fellowship.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—
ARTHUR R. CASH, Group Secretary.
7, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. MOUNT GOLD ORTHOPÆDIC HOS-PITAL (with Annexe 122 Beds). PLYMOUTH SPECIAL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER for the Orthopædic and Fracture Service, centring on Mount Gold Orthopædic and associate hospitals. Vacancy immediately.

Applications, stating age, qualifications with dates, &c., and with copies of 2 recent testimonials, to be forwarded to the Secretary, Mount Gold Hospital, Plymouth, within 14 days of this advertisement appearing.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. AREA PATHOLOGICAL DEPARTMENT. Applications invited from duly qualified and registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER in Pathology, vacant 27th July, 1954. The appointment will be for a period of 12 months, in the new area laboratory at the South Devon and East Cornwall Hospital, Greenbank-road, Plymouth, which provides excellent modern working facilities.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, to be sent to ARTHUR R. CASH, Group Secretary.
7, Nelson-gardens, Stoke, Plymouth.

PONTYPRIDD (near). EAST GLAMORGAN HOS-PITAL, CHURCH VILLAGE. (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 177,000. Recognised for the F.F.A. R.C.S.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

PORTSMOUTH. ST. JAMES HOSPITAL FOR MENTAL AND NERVOUS DISEASE. GROUP 49 HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGION. Applications are invited for the appointment of SENIOR PSYCHIATRIC REGISTRAR. The Hospital offers excellent experience in the diagnosis and treatment of all forms of mental illness and has separate Departments for Child Psychiatry and Neurology. Candidates should possess the D.P.M. and may visit the Hospital by appointment with the Physician-Superintendent.

Application forms may be obtained from the Group Secretary and should be returned to him, duly completed, within 3 weeks of the appearance of the advertisement.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

SENIOR HOUSE OFFICER required in the Traumatic and Orthopædic Department (105 Beds). Duties mainly at the Royal Portsmouth Hospital. Vacant now.

Queen Alexandra Hospital

(124 surgical beds). Recognised for F.R.C.S.

SENIOR HOUSE SURGEON vacant now.

Infectious Diseases Hospital (310 Beds—Fever and T.B.)

SENIOR HOUSE OFFICER, vacant now.

Applications, stating age, experience, and qualifications, and names of 2 referees, should be submitted as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of PÆDIATRIC REGISTRAR (non-resident), to the Portsmouth Group of hospitals. The holder of this appointment will be responsible for 70 pædiatric beds and will also have the oversight of newly born babies in a big Maternity Unit. Previous experience in diseases of children is essential and preference will be given to candidates holding the M.R.C.P. or D.C.H. Duties to commence 1st July, 1954.

Forms of application may be obtained from the Group Secretary, Portsmouth Group Hospital Management Committee, 35, Grove-road South, Southsea, which should be returned to him duly completed on or before 21st May, 1954. Canvassing will disqualify. Candidates may visit hospitals in the Group by arrangement with the Group Secretary.

PETERBOROUGH. THE MEMORIAL HOSPITAL. PETERBOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the position of SENIOR HOUSE OFFICER (orthopædics), vacant now. Exceptional experience offered in busy department.

Apply to the Secretary, Memorial Hospital, Peterborough.

READING. ROYAL BERKSHIRE HOSPITAL. (403 Beds.) Applications invited from registered Male or Female medical practitioners, for junior appointment of RESIDENT ANÆSTHETIST, vacant 7th June, 1954, for period of 6 months.

Applications, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (403 Beds.) Applications invited from provisionally registered Male or Female medical practitioners, for post of RESIDENT JUNIOR HOUSE SURGEON (general surgery), vacant 8th June, 1954, for period of 6 months.

Applications, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

READING AREA DEPARTMENT OF MEDICINE. Applications invited from provisionally registered Male medical practitioners for appointment of RESIDENT JUNIOR HOUSE PHYSICIAN, vacant 2nd June, 1954, for period of 6 months. Successful candidate will be required to carry out duties at the Royal Berkshire (403 Beds), Battle (420 Beds), and Prospect Park (104 Beds) Hospitals, Reading. Experience to be gained is exceptional; covering the whole field of clinical medicine, including children's diseases, fevers, pulmonary tuberculosis, and geriatrics.

Applications, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

REDHILL COUNTY HOSPITAL, Earlswood Common, REDHILL, SURREY. JUNIOR RESIDENT ANÆSTHETIST (Senior House Officer). 1 years appointment, vacant immediately. Recognised for Diploma.

Apply to Group Secretary at above address.

ROCHDALE. BIRCH HILL HOSPITAL. Pædiatric SENIOR HOUSE OFFICER (resident) now vacant. Recognised D.C.H.

Apply to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs. at once.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (resident) required for duties in the Casualties and Admission Department. This is a large general hospital with specialised departments dealing with all types of acute medical and surgical cases. The post affords good opportunity for gaining tuition and experience.

Applications should be addressed to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford, as soon as possible.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE PHYSICIAN required from 1st July, 1954.

Application should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON required from 14th June, 1954.

Application should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

SHREWSBURY. ROYAL SALOP INFIRMARY. Shrews-BURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male or Female) for the post of SENIOR HOUSE OFFICER or HOUSE OFFICER (pædiatric), to take charge of the Royal Salop Infirmary Children's Unit (80 Beds), under the Consultant Pædiatrician. Vacant 17th May, 1954. The Unit consists of medical, surgical and fever beds.

Applications, stating age, qualifications, nationality and experience, accompanied by copy testimonials, should be sent to the Group Secretary, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY. (241 Beds.) SHREWSBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of ORTHOPÆDIC/ACCIDENT HOUSE SURGEON (Senior House Officer). The successful applicant will be allowed to attend for 2 days a month at the Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry, for postgraduate study, with the Consultant. Post recognised under revised Fellowship regulations in respect of 6 months training required for the Final Fellowship examination. Vacant immediately.

Applications, stating age, qualifications, nationality and experience, accompanied by copy testimonials, should be sent to the Group Secretary, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COP-THORNE HOSPITAL. (500 Beds.) SHREWSBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE PHYSICIAN: approved for Pre-registration Service, and vacant 1st July, 1954.

Applications, stating age, qualifications, nationality and experience, accompanied by copy testimonials, should be sent to the Group Secretary, Royal Salop Infirmary, Shrewsbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (Registrar) at above Hospital.

Further details and application forms obtainable from and should be returned to Group Secretary, Odstock Hospital, Salisbury, within 14 days of the appearance of this advertisement.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Locum RESIDENT SURGICAL OFFICER (Registrar) required immediately at above Hospital.

Apply, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT or NON-RESIDENT CASUALTY OFFICER (Senior House Officer) for a period of 12 months. Post vacant now.

Applications, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT or NON-RESIDENT SENIOR HOUSE OFFICER to the E.N.T. Department. The Department is recognised for D.L.O. and F.R.C.S. Post vacant now.

Applications, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury, Wilts.

SCOTLAND. RED CROSS SANATORIA OF SCOT-LAND. (156 Beds.) Applications are invited for the post of ASSISTANT MEDICAL OFFICER (Senior House Officer grade). Terms and conditions of service will be in accordance with the existing national scale. A Thoracic Surgical Unit is situated at the Sanatoria and a large number of major surgical cases are dealt with annually. These posts offer valuable training in the selection of cases for major surgery, and in their preoperative and postoperative management.

Apply, giving full particulars of qualifications and experience, together with the names of 2 referees, to the Medical Director, Tor-na-Dee, Milltimber, Aberdeenshire, within 10 days of the appearance of this advertisement.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR in E.N.T. Surgery based at the Southern General Hospital, Glasgow, which will be for 1 year in the first instance. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 25th May, 1954.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Surgery based at the Victoria Infirmary, Glasgow.

REGISTRAR in Anæsthetics based at Glasgow Royal Infirmary.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, by 25th May, 1954.

SOUTHEND GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER to the Orthopædic and Fracture Departments. Post vacant mid-June.

Applications, stating age, qualifications and experience, to reach the undersigned by 12th May, 1954.

J. C. FIELD, Secretary.

SHEFFIELD. CITY GENERAL HOSPITAL. (Recognised for the F.F.A.R.C.S.) Applications are invited from suitably qualified practitioners (Male or Female) for the resident appointment of SENIOR HOUSE OFFICER in Anæsthetics, vacant 21st May. The post offers a wide experience in anæsthesia for general surgery, obstetrics and gynæcology, and in the Departments of Urology and Thoracic Surgery.

Applications, giving full details of age, nationality, qualifications, present and previous appointments with dates, and names of 2 persons to whom reference may be made, should be forwarded to the undersigned at Nether Edge Hospital, Sheffield, 11.

W. STANSFIELD, Secretary.

SHEFFIELD NATIONAL CENTRE FOR RADIOTHERAPY. SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (radiotherapy) required. Candidates should be in possession of Part I of D.M.R.(T.). The post offers excellent opportunities for research and great experience would be gained. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 17th May, 1954, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT SENIOR REGISTRAR (obstetrics and gynæcology) for the Leicester Royal Infirmary. Candidates should preferably be members of the Royal College of Obstetricians and Gynæcologists. Appointment for 1 year in the first instance reviewable annually. It has been agreed between the Sheffield Regional Hospital Board and the Board of Governors of the United Sheffield Hospitals that, if circumstances permit, the tenure of appointment will be divided between the Leicester Royal Infirmary and the Jessop Hospital for Women, Sheffield.

Applications, giving age, nationality, qualifications, present and previous appointments with dates, together with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, to arrive not later than 24th May, 1954.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT SENIOR SURGICAL REGISTRAR required for Nottingham General Hospital. Possession of higher surgical qualification desirable. Appointment for 1 year in first instance, reviewable annually. It has been agreed between the Sheffield Regional Hospital Board and the Board of Governors of the United Sheffield Hospitals that, if circumstances permit, the tenure of appointment will be divided between Nottingham General Hospital and the Teaching Hospitals.

Applications, giving age, nationality, qualifications, present and previous appointments with dates, together with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, to arrive not later than 24th May, 1954.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications are invited for the non-resident post of REGISTRAR to the Department of Radiology. Candidates should hold a Diploma in Diagnostic Radiology.

Applications, stating age, qualifications, and experience, with the names of 3 referees, should be sent immediately to the Chief Administrative Officer, The United Sheffield Hospitals, Weststreet, Sheffield, 1.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications are invited for the posts (non-resident or resident) of REGISTRAR and/or SENIOR HOUSE OFFICER in Anæsthetics. 1 post now vacant, the other vacant on 1st September. Grade according to qualifications and experience.

Applications, stating age, qualifications and experience, with the names of 3 referees, should be sent immediately to the Chief Administrative Officer, The United Sheffield Hospitals, Weststreet, Sheffield, 1.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE SURGEON required for post vacant 22nd May.

Applications, stating age and qualifications, &c., to Hospital Secretary.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.) HOUSE OFFICER required. Salary, &c., as nationally advocated.

Applications, with copies of testimonials, should be submitted immediately to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds.) HOUSE PHYSICIAN (resident) required in mid-May. Post tenable for 6 months ; available to pre-registration candidates.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) CASUALTY OFFICER/SENIOR HOUSE OFFICER (orthopædic) required for the above Hospital (Orthopædic Unit 74 Beds). This Hospital is the centre to which all trauma from a large industrial town and port is directed thus providing excellent experience in the treatment of traumatic conditions.

Applications, with copies of testimonials, to be submitted as soon as possible, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) ORTHOPÆDIC HOUSE SURGEON required. Post recognised for Pre-registration Service and tenable for 6 months. This Hospital is the centre to which all trauma from a large industrial town and port is directed, thus providing excellent experience in the treatment of traumatic conditions ; patients with orthopædic conditions are also drawn from a wide area.

Applications, with copies of testimonials, should be sent as soon as possible, to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL (278 Beds) AND SOUTHAMPTON GENERAL HOSPITAL (471 Beds). SENIOR HOUSE OFFICER (E.N.T.) required immediately. This post is recognised for the F.R.C.S. (Eng.) and D.L.O. examinations and provides experience in all branches of E.N.T. work, including audiometry. The Group includes a diagnostic and distributing hearing-aid centre.

Applications, with copies of recent testimonials, should be forwarded as soon as possible, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEON required from 14th May. Post available to pre-registration candidates, and tenable for 6 months.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment to fill a vacancy in the extended Supernumerary SENIOR REGISTRARSHIP in General Surgery to the Tunbridge Wells Group of hospitals, for 1 year in the first instance, as from 19th July, 1954. The appointment may be extended for a further period (but not beyond 31st December, 1955). Applications will be entertained from Senior Registrars whose appointments will end in the near future and, in certain circumstances, from former Senior Registrars. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 3 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 22nd May, 1954.

SOUTHPORT AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Southport General Infirmary

SENIOR HOUSE OFFICER (resident) general surgery and casualty duties.

Southport Promenade Hospital

SENIOR HOUSE OFFICER (resident), Surgeon, experience in orthopædic and E.N.T. work an advantage.

Apply, with copies of 2 testimonials, to—

T. CROOK, Group Secretary,
Southport and District Hospital Management Committee.
Promenade Hospital, Southport.

SOUTHPORT AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Southport General Infirmary

SENIOR HOUSE OFFICER (whole-time casualty post), vacant late June.

HOUSE PHYSICIAN. Recognised for pre-registration and vacant early August.

HOUSE SURGEONS. Recognised for F.R.C.S. and pre-registration. Vacancies in July.

Southport Promenade Hospital

SENIOR HOUSE OFFICER (mainly E.N.T. and orthopædic duties). Post vacant late June.

HOUSE PHYSICIAN, vacant now.

National Health Service terms and conditions of service.

Apply, stating age, nationality and qualifications, with copies of 2 testimonials to—

T. CROOK, Group Secretary,
Southport and District Hospital Management Committee.
Promenade Hospital, Southport.

STAINES HOSPITAL. North West Metropolitan Regional HOSPITAL BOARD. GYNÆCOLOGICAL REGISTRAR (resident) required at above Hospital. Unit has 32 Beds.

Application forms obtainable from, and returnable to, the Secretary, Staines Group Hospital Management Committee, Ashford Hospital, London-road, Ashford, Middlesex, by 18th May, 1954. Hospital may be visited by direct appointment with the Medical Director of Ashford Hospital.

STOCKPORT AND BUXTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the posts of :—

2 SENIOR HOUSE OFFICERS (anæsthetics). 1 post will be held at Stockport Infirmary (Locum for 3 months, from 1st June), and the other at Stepping Hill Hospital, Stockport (Locum or full-time), and they may be either resident or non-resident. Both posts are recognised for the D.A. and F.F.A. R.C.S., and there are facilities for study.

Stockport Infirmary, Stockport (163 Beds)

HOUSE OFFICER (general surgery and ophthalmology), vacant now. The post is approved for pre-registration purposes and recognised for the F.R.C.S. and D.O.M.S.

SENIOR HOUSE OFFICER (non-resident Casualty Officer), vacant 24th May. Hours of duty : 8.30 A.M. to 4.30 P.M., Monday to Friday ; 8.30 A.M. to 12 NOON Saturday. The post is recognised under F.R.C.S. regulations and would suit candidate wishing to study for higher qualification.

Applications, stating age, qualifications and experience, together with copies of 2 testimonials, or the names of 2 referees, to be forwarded to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, Cheshire.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (E.N.T.).

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics).

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE OFFICER (gynæcology and obstetrics, mainly surgery). Recognised for M.R.C.O.G. (gynæcology).

Applications, giving full details, together with copy testimonials, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for HOUSE OFFICER (general surgery), vacant now. Hospital recognised for F.R.C.S. examinations, and the post is recognised for experience during the pre-registration period.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (475 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of SENIOR HOUSE OFFICER (ophthalmics). Recognised for F.R.C.S. and D.O.

Applications, stating age, and experience, together with copy testimonials, to the Group Secretary at Head Office, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (938 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the posts of SENIOR HOUSE OFFICER (surgical). 2 posts are available if no applicants are forthcoming for pre-registration appointments. The posts are recognised for F.R.C.S. examination.

Applications, giving details of previous appointments held, together with copies of recent testimonials, should be forwarded forthwith to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (938 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the posts of HOUSE OFFICER (general surgery) pre-registration. 3 posts. Vacant shortly.

Applications, with copy testimonials, to be forwarded to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. BUCKNALL ISOLATION HOSPITAL. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the post of SENIOR HOUSE OFFICER (medical) vacant shortly.

Applications, with copy testimonials and full details, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SUTTON, SURREY. BANSTEAD HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital of 2400 Beds, which caters for all forms of nervous and mental disorders. The post offers an excellent opportunity for training in psychiatry and in particular in preparation for the D.P.M. for which courses of clinical instruction, including psychology, are arranged. Accommodation is available for a single person at a moderate charge.

Applicants should apply to the Secretary, Banstead Hospital, Sutton, Surrey, for form of application which should be returned duly completed, within 14 days of the appearance of this advertisement.

SWANSEA HOSPITAL. (403 Beds.) Glantawe Hospital MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident post of SENIOR HOUSE OFFICER in the E.N.T. Department of the above Hospital. The Hospital is recognised under the regulations of the F.R.C.S. (E.N.T.) and the D.L.O.

Applications, stating age, qualifications and experience, should be forwarded to the Group Secretary, St. Helen's-road, Swansea.

TAUNTON HOSPITAL MANAGEMENT COMMITTEE. TAUNTON AND SOMERSET HOSPITAL. Applications are invited for the post of HOUSE SURGEON (casualty and E.N.T.). This is a pre-registration post and is recognised by the Royal College of Surgeons as a qualifying appointment for the Final Fellowship examination.

Applications, stating age, qualifications with dates, nationality, and details of experience, together with 2 recent testimonials, to be sent immediately to the Secretary, Musgrove Park Hospital, Taunton, Somerset.

VENTNOR, ISLE OF WIGHT. ROYAL NATIONAL HOSPITAL FOR DISEASES OF THE CHEST. (249 Beds.) Required :—

JUNIOR HOSPITAL MEDICAL OFFICER, and
SENIOR HOUSE OFFICER.

Resident posts. Hospital has all facilities for major thoracic surgery.

Applications, with names of 2 referees, to Physician-Superintendent.

WAKEFIELD A GROUP HOSPITAL MANAGEMENT COMMITTEE NO. 9. Applications are invited for the appointment of a RESIDENT or NON-RESIDENT ANÆSTHETIST (Junior Hospital Medical Officer grade), for work in all branches of surgery in the Wakefield A and Wakefield B Groups, including thoracic anæsthesia at the Leeds Regional Thoracic Centre at Pinderfields Hospital, Wakefield. This post is recognised for the D.A. qualification, and becomes vacant in July, 1954. The salary and conditions of service being in accordance with the National Health Service regulations.

Applications should be made to W. READ, Group Secretary. Clayton Hospital, Wakefield.

WATFORD AND DISTRICT PEACE MEMORIAL HOSPITAL. (189 Beds.) Applications are invited from registered medical practitioners for the post of HOUSE SURGEON, recognised for pre registration. Post vacant beginning of June. Salary according to National Health Service scale.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent to—

CYRIL HOPKINSON, Administrator.

WORKINGTON INFIRMARY, Cumberland. (108 Beds, pre-registration post, recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second, or Senior House Officer post). Vacant 16th June.

Detailed applications with dates and copies 2 testimonials to Secretary.

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited for the post of HOUSE SURGEON (Male or Female), recognised for pre-registration, at the above Hospital. National Health Service terms and conditions. The staffing of the Surgical Unit consists of a Senior Registrar, Registrar and 2 House Surgeons. The post offers a comprehensive training in surgery.

Apply, giving full particulars, to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARRINGTON INFIRMARY. Warrington and District HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from qualified practitioners for the vacancy of RESIDENT ANÆSTHETIST (Senior House Officer grade), Male or Female, at the Warrington Infirmary. Scale of salary £670 p.a., less £130 p.a. for residential emoluments.

Applications to—

H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR (traumatic surgery) based at St. David's Hospital, Cardiff (resident).

REGISTRAR (general surgery) based at Caerphilly District Miners' Hospital, Caerphilly, Glam. (resident). Married quarters available.

REGISTRAR (psychiatry), Morgannwg Hospital, Bridgend. Hospital provides all modern methods of treatment, active Outpatient Clinics, Child Guidance, and Psychological Departments. Accommodation available.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WEST BROMWICH AND DISTRICT GENERAL HOSPITAL, Edward-street, WEST BROMWICH. (144 Beds.) WEST BROMWICH AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE GROUP NO. 18. Applications are invited for the post of HOUSE SURGEON, vacant immediately. Salary, terms and conditions in accordance with the Ministry of Health regulations. The post is tenable for 6 months, resident, and is recognised for Pre-registration Scheme.

Applications, together with 3 recent testimonials, should be submitted to J. O. ROBINS, Esq., Group Secretary.

WESTON-SUPER-MARE GENERAL HOSPITAL. (110 Beds.) Applications are invited from registered medical practitioners for the resident appointment of HOUSE SURGEON (non pre-registration). The appointment will be for a period of 6 months in the first instance and may be renewed for a further 6 months.

Applications, stating age, qualifications and experience, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WEYMOUTH AND DISTRICT HOSPITAL. (124 Beds.) CASUALTY OFFICER (Senior House Officer grade, salary £670 p.a.) required for 4 months, June–September, 1954.

Applications, stating age, qualifications, nationality and experience, and quoting 2 referees, to Group Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester, immediately.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. (200 Beds.) HOUSE SURGEON (Male or Female) with some casualty duties, required at the above Hospital. House Officer grade post, vacant 1st June, 1954. Recognised for F.R.C.S. examinations (pre-registration).

Applications, stating age, qualifications, &c., together with the names of 2 referees, should be received by the Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan, as soon as possible.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (311 Beds.) HOUSE PHYSICIAN required, vacant 1st July. May be pre-registration post.

Applications, with copies of 2 testimonials, to the Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. Obstetric AND GYNÆCOLOGICAL HOUSE SURGEON required (Male or Female), for post vacant 1st June. Obstetric post recognised for D.Obst.R.C.O.G. Successful candidate will be resident at the Old Windsor Unit of the Hospital. Applicants required to be members of a Medical Protection Society.

Applications, stating age, nationality, qualifications with dates, and copies of recent testimonials or names of 3 referees, to Hospital Secretary by 23rd May.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General and Orthopædic Surgery required (Male or Female). Post recognised for F.R.C.S. Preference given to persons seeking pre-registration House Officer post under Medical Act, 1950. Applicants required to be members of a Medical Protection Society.

Applications, stating age, nationality, qualifications with dates, and copies of recent testimonials or names of 2 referees, to Hospital Secretary by 23rd May.

WIRRAL. LEASOWE CHILDREN'S HOSPITAL, More-TON, WIRRAL, CHESHIRE. (223 Beds.) NORTH WIRRAL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from duly qualified medical practitioners for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade) at the above Hospital specialising in the treatment of long-term orthopædic, non-pulmonary tuberculous and general pædiatric conditions. This appointment, now vacant, gives ample scope to a practitioner reading for a higher qualification. Salary in accordance with National Health Service regulations—i.e., £670 p.a., less £100 p.a. in respect of board, &c.

Applications, giving full details of age, qualifications and experience, together with names and addresses of 3 referees, to Hospital Secretary, Leasowe Children's Hospital, Leasowe, Moreton, Wirral, Cheshire.

WOLVERHAMPTON GROUP.

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)
SENIOR HOUSE OFFICER or HOUSE OFFICER (Fracture and Orthopædic Department), vacant now.
HOUSE OFFICER (Ear, Throat, and Nose Department), vacant now.
HOUSE OFFICER (Casualty Department), vacant mid-May.

New Cross Hospital, Wolverhampton
HOUSE OFFICER (general surgery), vacant now.

Wolverhampton Eye Infirmary
2 Part-time NON-RESIDENT CLINICAL ASSISTANTS required, each 3 sessions weekly. Duties in association with Consultants mainly at 3 morning outpatient clinics. D.O. an advantage. Salary £525 p.a. for 3 sessions weekly.

Applications, with copies of 3 recent testimonials, to be sent to W. COCKBURN, Group Secretary.
The Royal Hospital, Wolverhampton.

WOKING AND CHERTSEY GROUP. St. Peter's Hospital, Chertsey. (430 Beds.) GUILDFORD GROUP. ROYAL SURREY COUNTY HOSPITAL, GUILDFORD. (229 Beds.) Full-time E.N.T. REGISTRAR required for above Hospitals. Recognised for F.R.C.S. and D.L.O.

Application forms can be obtained from, and should be returned by 20th May to, Secretary, Woking, and Chertsey Hospital Management Committee, "Huntington," Chertsey, Surrey. The Hospitals may be visited by arrangement. Tel. Nos.: St. Peter's, Ottershaw 441; Royal Surrey County, Guildford 2323.

WORCESTER. RONKSWOOD HOSPITAL. Gynæcological and maternity unit (Part I School). Applications are invited for the post of HOUSE SURGEON (obstetrics/gynæcology). The post is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Applications, with copies of testimonials, to the Hospital Secretary.

WORTHING HOSPITAL, Lyndhurst-road, Worthing, Sussex. (210 Beds—General.) WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications from either registered medical practitioners or pre-registration candidates are invited for the vacancy of HOUSE SURGEON which will occur at the beginning of June, 1954.

Applications, stating age, qualifications, experience, nationality and enclosing copies of 2 recent testimonials, to be forwarded to the Hospital Secretary as soon as possible.

A. V. OAKTON, Group Secretary.

YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.

Westwood Hospital, Beverley, Yorks (207 Beds)
(*a*) HOUSE SURGEON (first, second, or third post), vacant now. Approved pre-registration post. General surgical duties, some orthopædics. Recognised for F.R.C.S.
(*b*) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post), vacant now. Approved pre-registration post. Recognised for F.R.C.S.

Broadgate (Mental) Hospital, Beverley, Yorks (650 Beds)
(*c*) HOUSE PHYSICIAN (first, second, or third post), vacant now.

East Riding General Hospital, Driffield, Yorks (269 Beds)
(*d*) HOUSE SURGEON (first, second, or third post), vacant now. Approved pre-registration post. General surgical duties. Recognised for F.R.C.S.

Salary £425–£525. Fully qualified practitioners may apply for the pre-registration posts.

Detailed applications to Group Secretary, Westwood Hospital, Beverley, Yorks.

NEW ZEALAND. THE OTAGO HOSPITAL BOARD DEPARTMENT OF SURGERY. ORTHOPÆDIC AND TRAUMATIC UNIT. SENIOR ORTHOPÆDIC REGISTRAR, Dunedin Hospital. Applications are invited for the position of Senior Orthopædic Registrar to commence duty on 1st January, 1955. The applicant must possess a higher qualification in surgery and have had extensive experience in orthopædic and traumatic surgery. His duties will include the teaching of Medical Students, Nurses and Physiotherapy Students. The appointment is for a minimum of 1 year and tenable up to 3 years, subject to termination by 3 months notice in writing from either side. The salary payable under the Hospital Employment (Medical Officers) Regulations, 1952, Amendment No. 1 is £806 5s. p.a., rising by annual increments of £57 10s. to a maximum of £921 5s. p.a., plus cost-of-living bonus of £46–£62 p.a. A living-out allowance of £179 8s. p.a. is payable in addition to the above salary if non-resident. Travelling expenses are payable as stated in the Conditions of Appointment.

Application forms and further particulars may be obtained from THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or from the Office of the High Commissioner for New Zealand, 415, Strand, London, W.C.2. Applications, stating age, qualifications and experience, together with radiological and health certificates and copies of testimonials, will be received by the undersigned up till 10 A.M. on Monday, 28th June, 1954.

T. H. MILES, Acting Secretary.

P.O. Box 946, Dunedin, N.Z.

NEW YORK. NEW ROCHELLE HOSPITAL, New Rochelle, New York, U.S.A. (360-Bed general community hospital.) Approved by the Joint Commission on Accreditation of Hospitals. Also approved by American College of Surgeons and American Medical Association for Internship and Residency Training. Only graduates from approved university schools accepted. Term of Internship: 1st July, 1954–30th June, 1955. INTERNES—$150 per month plus full maintenance. Return passage to England paid by Hospital after completion of internship.

Apply Superintendent.

UNITED STATES. MOUNT AUBURN HOSPITAL, CAMBRIDGE, MASSACHUSETTS. Applications are invited for anesthesiology approved 2-year RESIDENCY beginning 1st September, 1954, 1st April, 1955, and 1st July, 1955. This is a 250-Bed community hospital. Teaching programme included. Salary $1800 first year and $3000 second year and full maintenance. Travel expense to and from the United States will be paid.

Apply: Director of Anesthesiology, P.O. Box 115, Cambridge, 38, Massachusetts.

CHANNEL ISLANDS, JERSEY. GENERAL HOSPITAL. Applications are invited for the post of CASUALTY OFFICER which will be vacant on 15th June, 1954, in the above Hospital. The appointment is for 6 months but is renewable for a further 6 months. Salary £400 p.a., less £100 for residential emoluments.

Applications to be submitted not later than 17th May, 1954, to the President, Public Health Committee, General Hospital, Jersey, C.I.

Public Appointments

COVENTRY. CITY OF COVENTRY. Applications invited for the joint post of SCHOOL MEDICAL OFFICER AND ASSISTANT MEDICAL OFFICER OF HEALTH for duties concerning medical inspection and clinic treatment of school children, maternity and child welfare work, and such other duties as the Medical Officer of Health and Principal School Medical Officer may include from time to time. Qualifications and experience in ascertainment of handicapped pupils an advantage. Salary £950–£1300. Commencing salary according to previous service.

Applications, with full details of qualifications and experience, to Principal School Medical Officer, Council House, Coventry.

DERBYSHIRE COUNTY COUNCIL. Appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH for the Derbyshire County Council AND MEDICAL OFFICER OF HEALTH for Shardlow Rural District and (from 10th June, 1955) Long Eaton Urban District. Applications are invited from Male or Female registered medical practitioners holding a Diploma in Public Health or an equivalent qualification for the above-named permanent "mixed" appointment. On appointment the total inclusive annual salary will be £1439 15s. 6d. and from 10th June, 1955, the total inclusive salary scale will be £1609 1s. 9d. p.a., rising by 4 annual increments of £54 10s. 10d., 1 of £54 11s., and 2 of £22 14s. 8d. to £1927 5s. 5d. p.a. A car allowance is payable. The person appointed will be directly responsible to the Council of the Rural District of Shardlow for the proper performance of all the duties of a Medical Officer of Health for that area. Under section 111 of the Local Government Act, 1933, Area No. 6 of the approved Scheme provides for a whole-time appointment to cover this District as well as Long Eaton Urban District. The Officer appointed will be required to undertake the duties of Medical Officer of Health of Long Eaton Urban District from 10th June, 1955. As Assistant County Medical Officer he will be concerned, under the direction of the County Medical Officer of Health, with decentralised supervision required under the National Health Service Act, as well as work in connection with the School Health Service, attendance at clinics, and such other duties as may be required. The Officer will be required to live in Area No. 6. Sympathetic consideration will be given to the provision of temporary housing accommodation if required. The Officer must not engage in private practice, and must devote the whole time to the duties of the before-mentioned posts. The appointment is subject to the provisions of the Local Government Superannuation Acts, 1937 and 1953, or the National Health Service (Superannuation) Regulations, 1950, whichever is appropriate and the successful candidate will be required to pass a medical examination. Canvassing, either directly or indirectly, will be a disqualification.

Application forms may be obtained from the undersigned to whom they should be returned so that they are received not later than 17th May, 1954.

J. B. S. MORGAN, County Medical Officer of Health.
County Offices, St. Mary's Gate, Derby.

DUBLIN. LOCAL APPOINTMENTS COMMISSION. Positions vacant.

(1) MEDICAL OFFICER, County Home and County Hospital, Cashel, and ANÆSTHETIST, County Hospital, Cashel. Salary £1050–£30–£1200. Temporary bonus may also be paid.

(2) ASSISTANT MEDICAL OFFICERS (2) under Cork Sanatoria Board. Salary £1000–£30–£1210, plus temporary bonus of £75.

Application forms and particulars from the Secretary, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms 5 P.M. on 25th May, 1954.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 8, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
TURRIFF	ABERDEEN	22ND MAY, 1954

RHONDDA URBAN DISTRICT COUNCIL AND GLAMORGAN COUNTY COUNCIL. Applications are invited from suitably qualified Men under the age of 50 years for the pensionable mixed appointment of DISTRICT MEDICAL OFFICER OF HEALTH for Rhondda, AND DIVISIONAL MEDICAL OFFICER AND DISTRICT SCHOOL MEDICAL OFFICER under the Glamorgan County Council, at an aggregate salary under Awards Nos. 2285 and 2321 of £1698 17s. 3d., rising to £2078 8s. 2d. p.a.

Forms of application and further particulars (which define "age limit") from the undersigned. Closing date for applications 22nd May, 1954.

D. J. JONES, Clerk of District Council.
The Council Offices, Pentre, Rhondda, Glam, 1st May, 1954.

HAMPSHIRE COUNTY COUNCIL. Applications are invited for the post of COUNTY MEDICAL OFFICER OF HEALTH at a salary of £2600–£100–£2900 p.a. Candidates must be registered medical practitioners, hold the Diploma in Public Health, and must have considerable administrative ability and a wide knowledge and experience of the organisation of Public and School Health Services. The person appointed will be required to perform all the duties imposed by law on a County Medical Officer of Health and such other additional duties as may be assigned to him by the County Council from time to time. He must devote the whole of his time to the duties of the appointment and neither directly nor indirectly engage in private practice or hold any other appointment. The successful candidate must reside within a radius of 5 miles of the City of Winchester. The appointment is pensionable and subject to the receipt of a satisfactory medical report, and will be terminable by 3 calendar months notice, in writing, on either side.

Applications, giving full details of qualifications and experience accompanied by 1 testimonial and naming 2 persons to whom reference may be made, should reach the Clerk of the County Council, The Castle, Winchester, by 28th May. Canvassing is prohibited and will disqualify.

HER MAJESTY'S COLONIAL SERVICE. Barbados. A MEDICAL OFFICER is required at the General Hospital, Barbados. Duties are general and those ordinarily performed in a large acute general hospital of 336 beds, including medicine surgery, obstetrics, theatre and ward work, anæsthetics, casualty, outpatient and other departmental duties as the Governor may from time to time direct. Candidates must possess qualifications registrable in the United Kingdom. Appointment will be on agreement for 3 years. Salary scale is $3600 to $4800 (£750 to £1000) a year, starting salary depending upon candidate's age and experience. A temporary cost-of-living allowance of £32 10s. p.a. is also payable. Free furnished quarters are provided. Free passages to Barbados are provided for the Officer, wife and children on first appointment and back to the United Kingdom on the satisfactory completion of the agreement, subject to a total maximum cost of $1440 (£300) each way. Income-tax at local rates. Social and recreational amenities are good. Climate is healthy for Europeans. Educational facilities are available.

Application forms can be obtained from the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith Street, London, S.W.1 (quoting reference No. CDE/117/28/02).

LONDON TRANSPORT EXECUTIVE. Applications are invited from registered medical practitioners for a post of MEDICAL OFFICER. The successful applicant will be responsible to the Chief Medical Officer for general clinical work and the medical supervision of working conditions. Commencing salary £1300 p.a. The appointment is subject to a medical examination. On completion of a satisfactory probationary period, the selected applicant will be expected to join a contributory superannuation scheme.

Applications, giving full details of qualifications and experience, together with the names of 3 referees, should be sent within 14 days of the appearance of this advertisement to the Staff Officer (F/EV 283), London Transport Executive, 55, Broadway, S.W.1.

MINISTRY OF HEALTH. Principal Medical Officer. The Civil Service Commissioners invite applications from registered medical practitioners (Men and Women) for this permanent pensionable appointment. Salary £2300 (London). The duties are concerned with the regional work of the National Health Services. Headquarters in London. Candidates must be of high professional standing with organising ability and wide experience of public-health administration.

Further particulars and application forms from the Secretary, Civil Service Commission, Burlington-gardens, London, W.1, quoting No. 4326/54. Application forms to be returned by 27th May, 1954.

PORTSMOUTH. CITY OF PORTSMOUTH. Public HEALTH DEPARTMENT. Applications are invited from registered medical practitioners for the appointment of ASSISTANT MEDICAL OFFICER OF HEALTH; preference will be given to candidates possessing the D.P.H. The doctor appointed will be responsible to the Medical Officer of Health for the operation of the Department's Immunisation and Vaccination Service and the Disinfestation (Scabies and Pediculosis) Clinic, and will also be required to carry out any other duties as he may direct. The salary scale is £950–£50–£1300, and regard will be had to previous service when fixing the commencing salary. The successful applicant will be required to pass a medical examination.

Application forms may be obtained from, and should be returned to, the Medical Officer of Health, 1, Western-parade, Portsmouth, not later than Saturday, 22nd May, 1954.

V. BLANCHARD, Town Clerk.

City Council Chambers, 1, Clarence-parade, Portsmouth.

WEST LOTHIAN. COUNTY COUNCIL OF THE COUNTY OF WEST LOTHIAN. ASSISTANT MEDICAL OFFICER OF HEALTH. Applications are invited from registered medical practitioners (Male) holding the D.P.H., for the above permanent post. The duties are mainly those of the School Health Service, but include work in connection with the Public Health Preventive Services, aged persons, and infectious disease. Proficiency in tuberculin skin testing and B.C.G. vaccination will be an advantage. Salary scale £950–£1300 by annual increments of £50, with placing according to experience. The post is superannuable.

Applications, giving details of age, qualifications and experience, together with the names of 3 referees, to be lodged with the undersigned within 14 days of the appearance of this advertisement.

JOHN CALDER, County Clerk.

County Buildings, Linlithgow. 23rd April, 1954.

LANCASHIRE COUNTY COUNCIL. Applications are invited for the superannuable appointment of CHIEF ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH. Applicants should possess a Degree or Diploma in State Medicine or Public Health, have a sound knowledge of clinical medicine and practical experience in public health administration. Salary £1650–£50–£1900. Appointment subject to medical examination.

Application forms obtainable from County Medical Officer of Health, County Offices, Preston, to be returned not later than 17th May, 1954.

LONDON COUNTY COUNCIL. Psychiatrist (whole-time) required in connection with Health and Education and Children's Department Services. Duties include, inter alia, examining and advising on individual children; visiting boarding schools and homes to advise staff on treatment and care of problem and maladjusted children; attending case conferences. Salary scale £1750–£50–£2050, commencing point dependent on experience.

Further particulars on application form obtainable from the Medical Officer of Health (PH/D1), County Hall, S.E.1, and returnable by 19th May. (495.)

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

BIRMINGHAM. SPARKBROOK. Applications invited for VACANCY (urban) due to retirement. List approximately 3350. Residence and surgery will be available. Apply on E.C.16A not later than 17th May, 1954, to—

K. F. G. DAY, Clerk of Birmingham Executive Council.

Sutton New-road, Erdington, Birmingham, 23.

YORK. Applications invited for general medical practice VACANCY (urban) caused by resignation. The practice has been in the hands of a lady doctor and the list is approximately 3100. The residence and surgery may be available. Apply on Form E.C.16A before 20th May, 1954, to—

J. PEARSON, Clerk, York Executive Council.

133, Holgate-road, York.

Miscellaneous

To non-professional posts the notification of Vacancies Order 1952 applies.

Orthopædic Surgeon seeks opening overseas preferably in Canada. British, aged 39, married with 2 children. 2 higher qualifications full Consultant status since 1948. ex-R.N.V.R. Highest references, &c.—Address, No. 926, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Wanted. Assistant Medical Officer for large chemical factory in Yorkshire. Exceptional opportunities for young man keen on toxicology and general industrial medical problems. Salary according to qualifications and experience, minimum £1150 p.a.—Applications in writing to Staff Dept., IMPERIAL CHEMICAL INDUSTRIES LIMITED, Dyestuffs Division, Hexagon House, Blackley, Manchester, 9.

British Oil Company requires immediately Medical Officer with surgical experience and qualifications for their Medical Service in Ecuador. Age 30–40 years. Salary according to experience but not less than £1400. 3 years contract in the first instance. Free furnished quarters and passage, also cost-of-living allowance in local currency.—Apply, giving details of professional qualifications and experience with 2 references, to: Address, No. 924, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

For Sale. A long-established extensive and interesting Multi-Racial E.N.T. Surgical Practice in Nairobi, Kenya. Full range of instruments in excellent order is available at below list prices. Terms will be considered.—Replies by air-mail to Box 384, Nairobi.

Medical Secretary (shorthand-typist) required, 2 evenings a week, in Putney, for Consultant Physician.—Address, No. 925, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

"Hand-picked" Secretaries and Typist-receptionists for Consultants: whole or part time. Highest standards of efficiency.—WIGMORE AGENCY, 67, Wigmore-st., W.1 (HUN 9951/2/3).

Devonshire-place, W.1. Consulting-room, newly decorated, size 18 ft. by 24 ft. with ante-room 9 ft. by 12 ft. available now. Parquet flooring throughout. £375 p.a., including receptionist. Suitable for a partnership.—Box No. C.A.S. 267, 25, Haymarket, London, S.W.1.

In a growing district, at present with no resident doctor, Convenient to Bournemouth and Wimborne. Modernised thatched cottage residence, 5 bedrooms (3 h. & c.), bathroom, 2 reception-rooms, kitchen with Aga cooker, garage for 4 cars. Outbuildings. Main electricity and water. Attractive gardens, orchards, paddock. About 5 acres. Price £6000 freehold with possession.—FOX & SONS, 44–52, Old Christchurch-road, Bournemouth (Tel.: 6300).

Flat to let unfurnished. Conversion large house St. John's Wood, separate entrance. Most suitable for private and/or practice. 4 very large rooms, kitchen, bathroom. Separate toilet, store room. £175 p.a. Exclusive. £2000 for 45-year lease.—Address, No. 927, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE, LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Printed by HAZELL, WATSON & VINEY, LTD., London and Aylesbury—Saturday, May 8, 1954.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York U.S.A. Office.

NEW for TRIGEMINAL NEURALGIA

'DISTIVIT' B12

brand

Injection of Vitamin B12 B.P.

★ 1,000 micrograms

The success obtained with vitamin B12 in treating the neurological complications associated with pernicious anæmia has stimulated research into the treatment with this important vitamin of other neurological disturbances. *In trigeminal neuralgia it has been found that relief from pain can be produced by injection of massive doses. For the average case 1,000 micrograms intramuscularly daily for ten days followed by twice weekly injections for two or three weeks is suggested as a suitable course.

★ Ann.Int.Med. *35:* 1028. (1951)

★ South African M.J. *25:* 394. (1951)

★ Neurology. *2:* 131. (1952)

★ Lancet. *1*: 439. (1954)

Packs ● **'DISTIVIT' B12, 1 ml. ampoules each containing 1,000 micrograms vitamin B12, boxes of 5 ampoules.**

Distributors ● **Available from:**

● **BURROUGHS WELLCOME & CO.**

● **EVANS MEDICAL SUPPLIES LTD.**

● **IMPERIAL CHEMICAL (PHARMACEUTICALS) LTD.**

THE DISTILLERS COMPANY *(Biochemicals) Limited*

SPEKE *owners of the trade mark 'Distivit'* **LIVERPOOL**

32/54

NEW ORAL ANTIHYPERTENSIVE

SERPASIL

containing Reserpine, a pure crystalline alkaloid, isolated in the CIBA Research Laboratories from Rauwolfia serpentina.

GRADUAL AND SUSTAINED REDUCTION OF BLOOD PRESSURE WITH MILD SEDATION INDUCING A FEELING OF TRANQUILLITY

Free from toxic side effects
Ideal for the ambulant patient

Tablets of 0.1 mg. and 0.25 mg. available in bottles of 25, 100 and 500

'Serpasil' is a registered trade mark Reg. user

CIBA LABORATORIES LIMITED
HORSHAM · SUSSEX

2/4